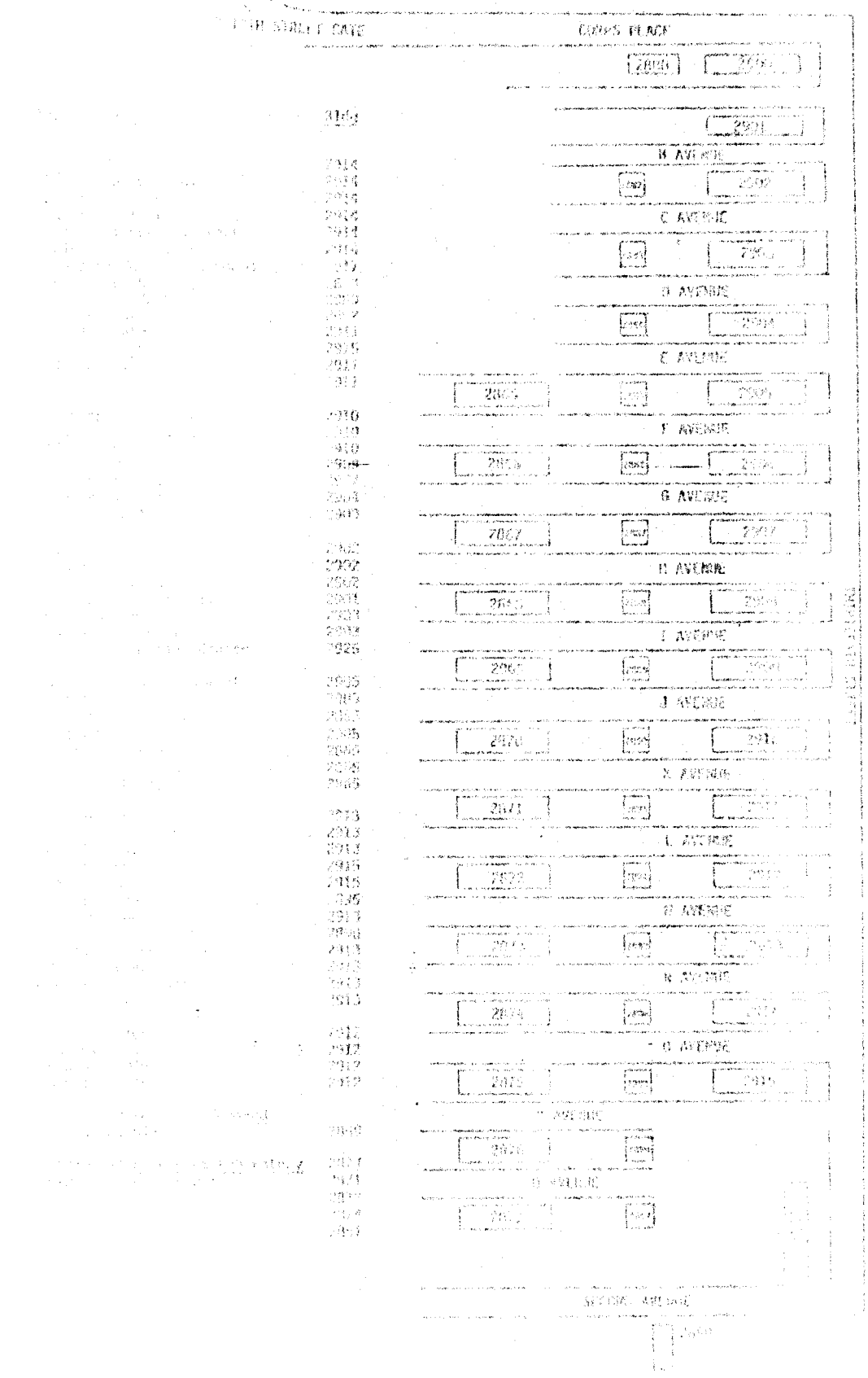

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This manual provides guidance for the staff, project teams, Instrumentation Command (IC), Experimentation Support Command (ESC), and the Scientific Support Laboratory (SSL), in the fundamentals of planning, conducting, and reporting of US Army Combat Developments Experimentation Command. In addition, the manual is designed to assist in orienting and instructing newly assigned personnel to combat developments experimentation duties.

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DEPARTMENT OF THE ARMY
HEADQUARTERS
US ARMY COMBAT DEVELOPMENTS EXPERIMENTATION COMMAND
FORT ORD, CALIFORNIA 93941

REPLY TO
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PREFACE

This manual provides guidance for the staff, project teams, Instrumentation Command (Provisional), Experimentation Support Command (ESC), and the Scientific Support Laboratory (SSL) in the fundamentals of planning, conducting, and reporting of CDEC experiments. Responsiblities, coordination procedures, and format as documented in this manual are directive in nature. However, experimentation techniques will be developed to meet approved experimentation requirements. In addition, the manual is designed to assist in orienting and instructing newly assigned personnel to combat developments experimentation duties.

This manual may be of value to other agencies of the Combat Development System. The contents, however, do not represent the official view of the US Army Training and Doctrine Command (TRADOC) or the Department of the Army (DA). This manual will not be cited in correspondence addressed to agencies outside the US Army Combat Developments Experimentation Command (CDEC).

This manual supersedes USACDEC Experimentation Manual, dated December 1978, and all changes thereto.

HENRY J. WERESZYNSKI
Colonel, GS
Chief of Staff

CONTENTS

CHAPTER 1

INTRODUCTION

1.1 PURPOSE. The purpose of this manual is to provide guidance for the command and the scientific staff in the fundamentals of planning, supporting, conducting, and reporting Combat Developments Experimentation Command (CDEC) experiments. This manual also serves to orient newly assigned CDEC personnel to the conduct of CDEC field experimentation.

1.2 SCOPE OF MANUAL.

a. Chapter 1 of this manual presents CDEC's organization and mission and a brief history of the Command. Chapter 2 provides background information on the scope of US Army testing and CDEC field experimentation terminology. Chapter 3 gives an overview of the CDEC experimentation process, listing the basic steps through which a typical CDEC experiment will pass from initial proposal to final reporting. Chapters 4, 5, 6, and 7 each treats an individual sub-task of the experimentation process that was outlined in Chapter 3 and furnishes detailed information on how this task is to be accomplished.

b. Appendix A is a compendium of editorial and formatting requirements which must be taken into account in the production of any formal CDEC plan or report. Appendixes B through H contain information on budgeting, experimentation planning, data bank requirements, documentary film requirements, use of human volunteers, references, abbreviation, and a glossary.

1.3 CDEC'S COMMAND RELATIONSHIPS, MISSION, AND FUNCTIONS.

a. Command Relationships. CDEC is a subordinate command of the US Army Training and Doctrine Command (TRADOC), Fort Monroe, VA. Figure 1-1 shows CDEC's position in the TRADOC organizational structure. Currently CDEC receives staff supervision from the TRADOC Deputy Chief of Staff for Test and Evaluation (DCSTE)

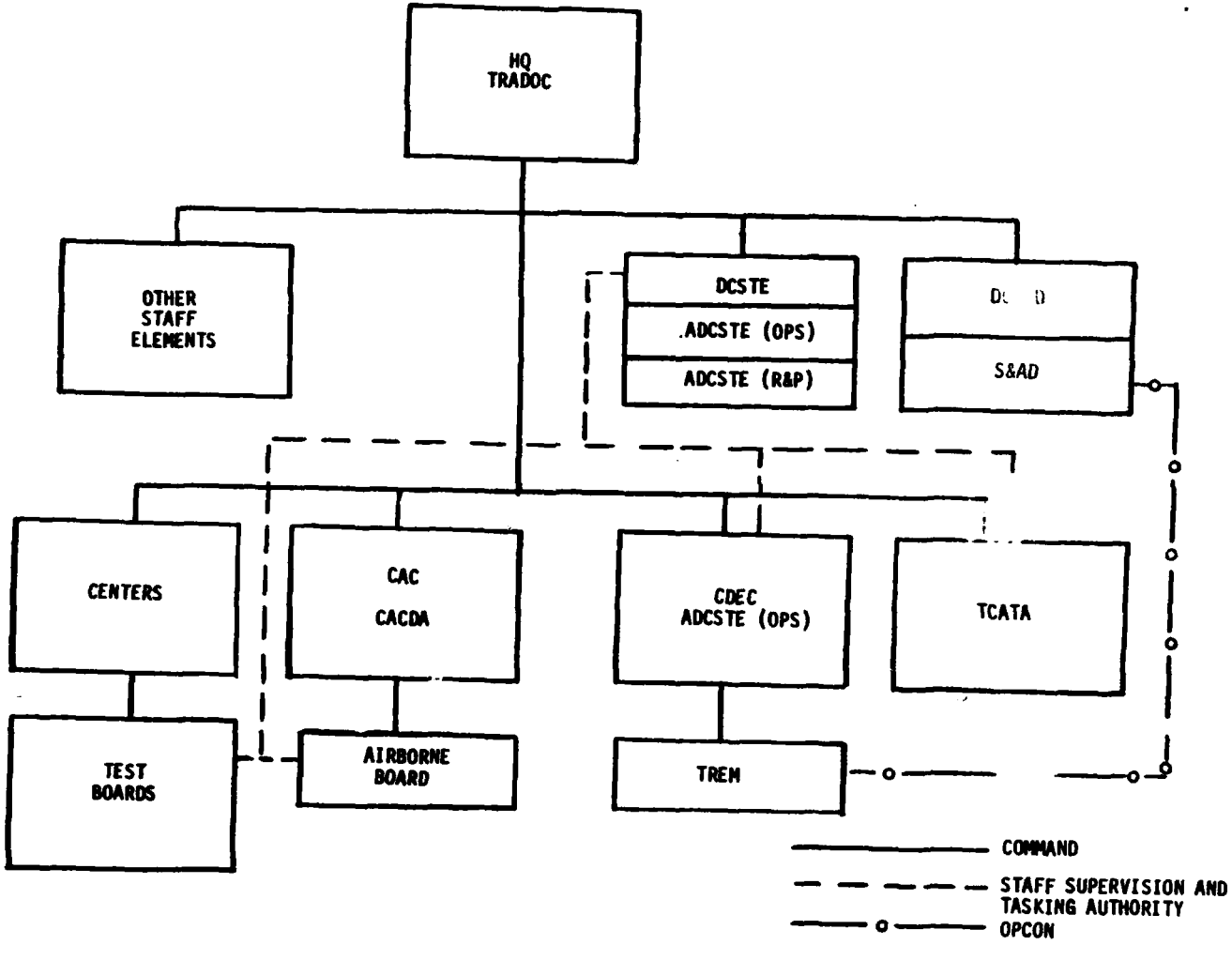


Figure 1-1. US ARMY ORGANIZATION FOR COMBAT DEVELOPMENTS

who is also the Commander of TRADOC Combined Arms Test Activity (TCATA). Both organizations have their headquarters at Fort Hood, Texas. It should be noted that Commander, CDEC also serves as the TRADOC ADCS, T&E for Operations. The TRADOC Research Element, Monterey (TREM) is a small (currently 7-person) research and student counseling group stationed at US Naval Postgraduate School, Monterey.

b. The mission of CDEC is to support the combat development and training development processes by conducting scientific field experimentation that will:

(1) Develop and provide experimentally derived high resolution data as input for models, simulations or war games used in the analysis and evaluation of combat development alternatives.

(2) As directed, test and provide experimentally derived data on developmental options created by TRADOC schools and centers.

(3) Verify recommended solutions for operational concepts, material requirements, and organizational structures.

(4) Assist TRADOC centers and schools in experimental design, instrumented field testing and scientific analysis to further the evaluation of combat developments and training development programs, methods, or devices.

(5) Assist the 9th Infantry Division, Fort Lewis, Washington in the planning, instrumenting, and analysis of its High Technology Test Bed projects.

c. The major functions of CDEC are to:

(1) Command units assigned or attached.

(2) Design, plan, program, and conduct field experiments in accordance with the instructions and procedures established by the TRADOC Commander and the Five Year Test Program (FYTP).

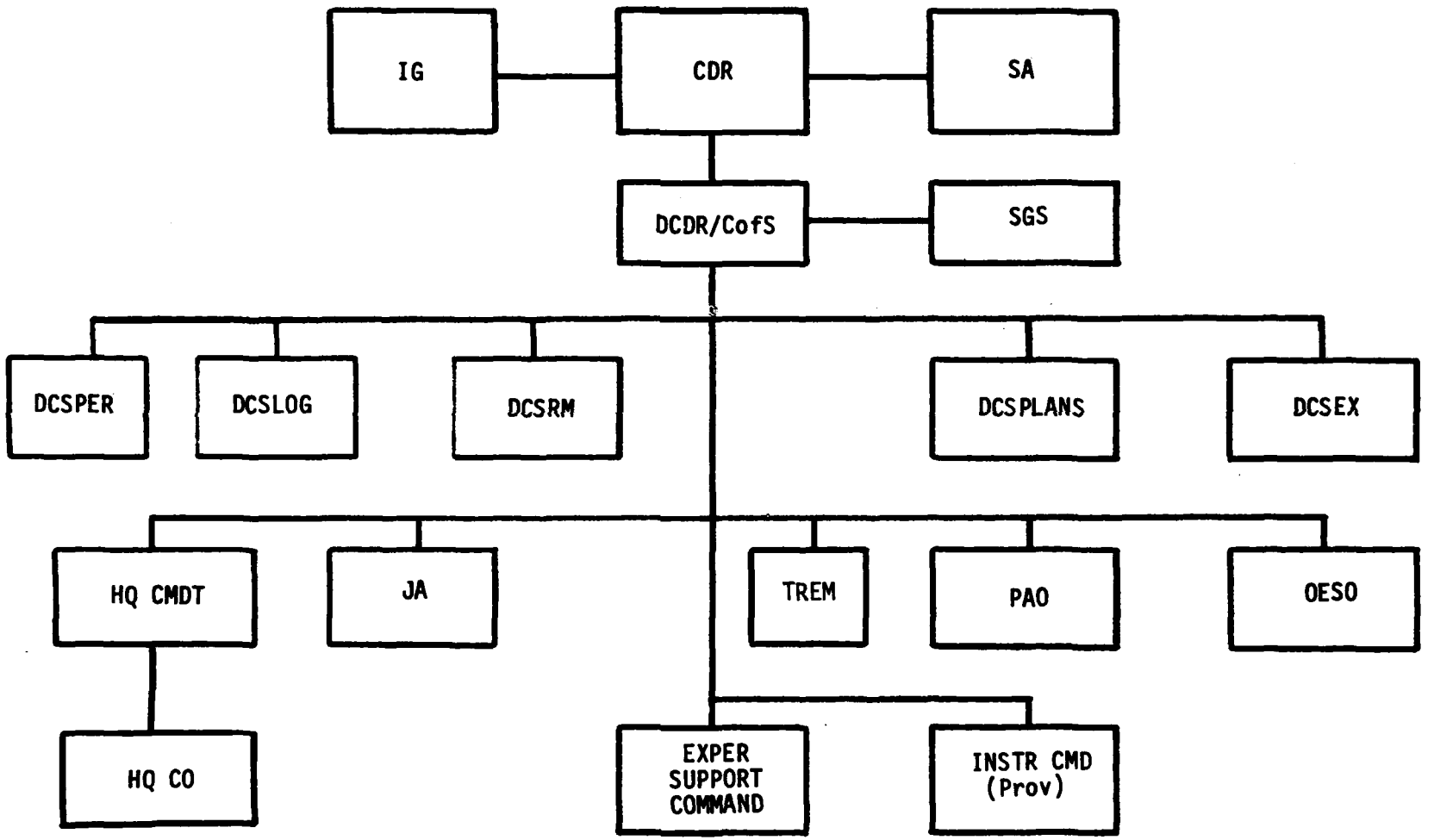


Figure 1-2. CDEC ORGANIZATION

(3) In accordance with the annual budget guidance, plan and prepare budget estimates to support the CDEC portion of the TRADOC program and supervise budget execution.

(4) Design, establish, and maintain experimentation methodology and an experimentation field laboratory.

(5) Determine the requirements for contractual operations research and submit appropriate requests to HQ, TRADOC.

(6) Recommend Tables of Distribution and Allowances (TDA) for CDEC to HQ, TRADOC.

(7) Maintain assigned and attached troop units in a combat readiness posture compatible with assigned contingency and mobilization deployment missions.

d. Figure 1-2 is a simplified diagram of the organizational structure of CDEC. Reference 1.6a (CDEC Reg 10-1) provides further details on CDEC's internal and external organizational relationships.

1.4 CDEC'S LOCATION.

a. As Figure 1-3 illustrates, CDEC's Headquarters is located at the northwest corner of Fort Ord in a complex of buildings sited on what, after 25 years of occupancy, has become known as "CDEC Hill." For the last decade, Fort Ord has been the home of the 7th Infantry Division. CDEC only rarely performs experimentation on Fort Ord's 22,000 acres.

b. A drive of about 1½ hours duration south on Highway 101 (the historic El Camino Real) and the Jolon Grade road — brings one to CDEC's Field Laboratory at Fort Hunter Liggett (FHL). This fort's large size (+ 166,000 acres), varied terrain, and isolation from urban population concentrations (which provides for good electronic isolation and

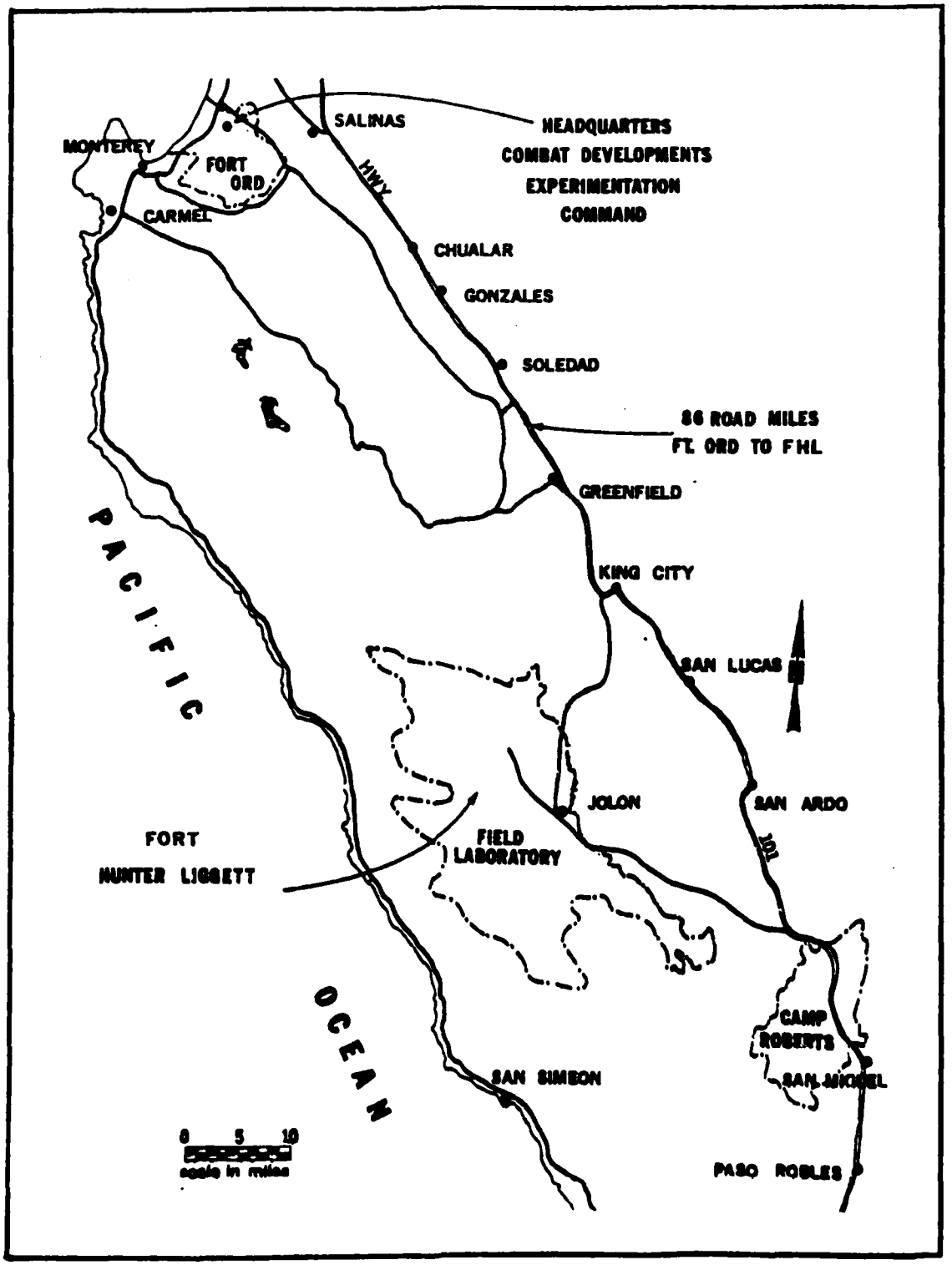


Figure 1-3. CDEC'S LOCATION

unusually dark night skies) make it an excellent site for field experimentation. Headquartered here is CDEC's Instrumentation Command (Provisional) which is charged with maintaining and improving FHL's multimillion dollar "electronic battlefield" range. The Experimentation Support Command (ESC) is also headquartered at FHL.

1.5 HISTORY OF CDEC.

a. After World War II, recognizing the urgent necessity of keeping up with an accelerating rate of change in military technology and desiring to improve the development of organizations and doctrine, the Department of the Army directed that a series of studies be made to determine a means for testing and evaluating military innovations in a peacetime environment. The California Institute of Technology was commissioned to study and recommend improvements in organization and procedures for combat developments. This study, known as Project Vista, recommended in 1952 that a centralized combat development system be established along with a developmental group to field test new combat concepts. The Combat Developments System evolved from this project. This System contained some 30 service schools and materiel development agencies, but had no central field test group. The need for such a group soon became quite evident, however, and on 5 October 1956 USCONARC General Order No. 39 established the Combat Developments Experimentation Center (CDEC) at Fort Ord, California.

b. The Combat Developments Experimentation Center began work November 1, 1956 with two officers and three scientists. By the time the new experimentation center was to undertake its first experiment in March 1957, the headquarters had grown to 44 officers and 15 scientists. The area available for experimentation was Hunter Liggett Military Reservation and adjacent Park Service land in the Los Padres National Forest, located 55 air miles south of Fort Ord, and Camp Roberts, an additional 30 air miles distant. The first experiment, entitled "Umpire Techniques and Procedures," was designed to establish the distinction between objective experimentation and the traditional troop tests which up to then had been the Army's principal testing means.

c. CDEC conducted 28 field experiments of varying sizes and complexity during its first six years of operations. Most of these experiments were conducted with little or no special instrumentation and involved "clipboard, stopwatch, and spreadsheet" data

collection and reduction techniques. At that time very little existed anywhere in the way of scientific concepts, methodologies, or instrumentation systems for military field experimentation. CDEC was thus urged into what has become one of its historically most important roles -- that of being a pioneering developer of the concepts, methodologies, and instrumentation of modern field experimentation.

d. On 1 July 1962, CDEC became a subordinate command of the Combat Developments Command (CDC). This involved a change in name to the Combat Developments Command Experimentation Command (CDCEC), but no change in mission. On August 10, 1971, this unit's name became Combat Developments Experimentation Command (CDEC). Upon the 1973 deactivation of the Combat Developments Command, CDEC was transferred to the Training and Doctrine Command.

e. The mid-1960's saw the execution of several large-scale army aircraft survivability studies and the Infantry Rifle Unit Study (IRUS). TRADOC Pamphlet 71-5, Force Development Catalog of USACDEC Field Experiments lists these and most other experiments executed by CDEC. The CDEC Technical Library, Fort Ord, contains copies of final reports of these experiments.

f. In October 1965 a special $32.6 million 5-year (FY 66 - FY 71) Technical Development Program was approved. The primary program objective was that, by the close of the 5-year program period in June 1971, CDEC would be capable of running fully instrumented two-sided Real Time Casualty Assessment (RTCA) experiments. To achieve this instrumentation capability CDEC had to develop and procure: (1) a large scale central computer, (2) a player position location and data event telemetry system, and (3) a direct fire simulator system. The central computer, a specially adapted General Electric M-605, was purchased in 1967 and acceptance testing was completed in July 1969. The contract for developing Item (2), was let in June 1966. The first Range Measuring System (RMS) prototypes arrived at Fort Hunter Liggett in 1968 but technical problems delayed final system acceptance until mid-1970. Development of the Direct Fire Simulator (DFS) began in 1968 with prototypes arriving in October 1969. Continuous testing of the system culminated in the DFS Evaluation Test in March - June 1971. The first RTCA field experiment, Experiment 43.6, was executed at Fort Hunter Liggett in the fall of 1971.

The multi-national Tactical Effectiveness Test of Anti-Tank Missiles (TETAM) experiment of 1972 - 1974 brought wide-spread attention to CDEC's unique instrumentation and its RTCA experimentation capabilities. Reference 1-g, the Real Time Casualty Assessment Handbook, defines and explains the concept of RTCA experimentation.

g. Table 1-1 illustrates the number and variety of the experiments that have been executed by CDEC in five recent years. Forty experiments and tests were executed and reported on during the FY 1976 - FY 1980 time period — an average of eight per year. The high-low mix of the CDEC experimentation schedule is readily apparent. Typically, one or two large-scale highly instrumented, usually RTCA, experiments are executed each year in the Fort Hunter Liggett field laboratory. Surrounding these "center stage" experiments in the schedule (and imparting important flexibility to this schedule and to the allocation of CDEC resources) there are usually a number of medium and small scale experiments. These latter experiments, although small in scope and often light in instrumentation, have provided the Army with numerous useful answers to important questions. Lightly instrumented experiments have geographic flexibility and CDEC experiments have been executed at many United States and foreign locales. (Table 1-1 shows five experiments executed in the Federal Republic of Germany.) Five of the experiments listed in Table 1-1 were methodology tests, with CDEC acting as its own proponent to test advances in the state of the experimentation art.

h. References 1-c, 1-d, and 1-e contain the history of CDEC through 1973. Since 1975 an "Annual Report of Major Activities" document has been published by the CDEC historian.

1.6 REFERENCES.

a. CDEC Reg 10-1, Organization, Mission and Functions of CDEC, June 1981.

b. TRADOC Regulation 71-9, "Force Development User Test and Evaluation", 1 May 1981.

c. Longham, LTC Harauld D., "Historical Summary, United States Combat Developments Command Experimentation Command, 1 November 1956 - 30 June 1964," CDEC Report.

d. Romzue, John L., "Historical Summary, United States Combat Developments Experimentation Command 1964 - 1969", CDEC Report, Dec. 1970.

e. Romzue, John L., "USACDEC Historical Summary, 1970 - 1971", CDEC Report, July 1972.

f. TRADOC Pamphlet 71-5, "Force Development - Catalog of USACDEC Experiments."

g. CDEC Report "Real Time Casualty Assessment Handbook, Volume I, Simulation Models," October 1980.

Table 1-1. CDEC EXPERIMENTS FY 76 - FY 80

FY 1976	
PARFOX VII	Evaluation of effectiveness of Parapet, Split-Parapet and Standard Foxholes (RTCA - infantry).
TEMAWS	Effectiveness of scatterable antitank missiles (RTCA - armor).
ITV DT/OT-1	Test of three candidate Improved TOW vehicles.
TRAPS	Time for tactical troops to reach cover upon initiation of an indirect fire attack (one-sided small scale).
TAHOE	Ability of TOW system to engage helicopters (one-sided film data).
SOTAS REFORGER-SOTAS KOREA	Evaluation of the effectiveness of a SOTAS equipped helicopter during Reforger 76 (West Germany) and a one week demonstration in Korea.
FAF	Small scale evaluation of the MK19 40 mm Grenade Launcher (Live fire).
Experiment 43.7 Phase IIB	Second subphase of CDEC's 5th Attack Helicopter Experiment since 1970 (one-sided night acquisition test).
SUPEX	Suppression Effects of Weapons. (Live fire vs. protected players.)
ATMT - Phase II	Ability of maneuvering tactical vehicles to avoid hits from ATGM's and guns (one-sided non-live fire).
FY 1977	
HIMAG IIA	Test for the Advanced Combat Vehicle Project of the effect of high-speed target maneuvers on antitank weapon hit probabilities (one-sided, camera-recorded data).
JAWS	Large scale, low resolution test of AH-1S/A-10 teams vs. a large threat armored force.
MAPPRO III	Last in a series of CDEC field evaluations of new map products.
TISE	Tanks vs. LAW-equipped infantry in a smoke environment.
CATMAT	Mobility of tracked vehicles on selected terrain in comparison with a predictive model (small scale test).
DDC/C_3	Evaluated taking a large computer to Europe during Reforger 77 (conducted in West Germany).
HONEST II	Evaluation of the XM42S weapon simulator.
LASER - PH	Hit probabilities of M16 rifle live fire vs. IDFSS laser (Methodology Improvement Test).
RT-77, TAMI Exploratory	Two methodology tests of the ability of CDEC's new Multiple Computer System to adequately direct RTCA experimentation.

Table 1-1. (Continued)

FY 1978	
TIE	Development and evaluation of RTCA-based tactical training for the National Training Center (RTCA - Armor + Infantry).
IFV-TEA	Field evaluation of intervisibility and other tactical characteristics of terrain in Fulda Gap (conducted in West Germany).
DUAL-TEX	Relative detectability of tactical vehicles with standard vs. new camouflage pattern.
HAT	Helicopter Acquisition Test (one-sided, ground-to-air detection test).
SUPER-IFCAS	Proposed improvements to CDEC's indirect fire simulation (Methodology Improvement Test).
SUPEX III	Last in a 4-year series of tests of weapon suppressive effects (live rounds exploded near protected players).
COPPERHEAD GFE	Test of COPPERHEAD laser designation in a foggy environment (conducted at Fort Ord).
FY 1979	
BIFF	Battlefield Identification Friend or Foe (one-sided test).
TEA-DRAGON	Effectiveness of three alternative DRAGON gunner training programs (live fire).
5th Tank Crewmen	Evaluated impact of assigning five crewmen per tank in selected armor units (conducted in West Germany and several CONUS posts).
TASVAL	Effectiveness of attack helicopter and A-10 fighters against a threat armored battalion (RTCA - Joint Test with USAF and USMC).
UHF Tank Radio	Study of the feasibility of using the UHF-AM radio frequency band for tank-to-tank communications.
MILES OT III - RAM	Evaluated the reliability of the MILES engagement simulator during USAREUR OT II (conducted in FRG).
MMGR	Test of Man-Made Geographic References such as bridges, church steeples, road junctions, etc., and their use in player self-location (a minimum resource "Mini-Test" for AMSAA).
DUGWAY LASER TEST	Measured DFS laser's effectiveness in various smoke and dust environments (Methodology Improvement Test at Dugway, Utah).
FY 1980	
HELLFIRE OT II	Operational Evaluation of HELLFIRE Missile (live fire and two-sided engagement simulation trials).
ARMVAL	Evaluation of the concept of a Light Armor Vehicle (RTCA - Joint Test with Marine Corps).
MOCAT	Mobility Through Contaminated Areas (AMSAA "Mini-Test").
NTC 1A	Development/Evaluation of Tactical Training Simulation (RTCA -follow-on to TIE).
Helicopter Relative Detectability Test	Small scale test of differences in detection of CH-3, UH-1, and AH-1 helicopters.

CHAPTER 2

FIELD EXPERIMENTATION

2.1 GENERAL. Since CDEC's primary mission is to conduct scientific field experiments, it is important that personnel assigned to CDEC have a common basis of understanding of this term. This chapter will attempt to furnish at least a rudimentary basis of understanding by discussing the full range of tests and experiments conducted by agencies of the US Army, by introducing CDEC's Soldier-Scientist Team, and by presenting certain scientific definitions and procedures which are widely used in the CDEC field experimentation process.

2.2 CATEGORIES OF US ARMY TESTING. US Army testing includes both combat development testing and training development testing.

a. Combat Development Testing.

(1) Definition of Combat Development. Combat development is defined as the formulation of new Army doctrine, organizations, materiel objectives and requirements, and the integration of the resulting products of this formulation into the Army. This process encompasses research, development, testing, and integration into the Army of new doctrine, organization, and materiel to obtain maximum combat effectiveness with a minimum of men, money, and materials. The combat development function is divided into the development of materiel and the development of organization and doctrine.

(2) Purpose of Combat Development Testing. During the combat development process, tests are conducted for the following purposes:

(a) To determine the degree to which an item or system meets technical and operational performance specifications.

(b) To verify the correction of problems that were identified in earlier testing.

(c) To resolve critical issues.

(d) To provide data to decision makers.

(e) To provide data for models and simulations.

(3) Types of Combat Development Tests.

(a) Development Testing (DT). As part of the materiel acquisition process, the materiel developer conducts development tests to determine the degree to which an item or system meets performance specifications and to estimate what its military utility will be when it is introduced. Most development testing is conducted by the Army Materiel Development and Readiness Command (DARCOM) in factory, laboratory, and proving ground environments. The Test and Evaluation Command (TECOM) is the principal DARCOM test organization.

(b) User Testing. User testing is also part of the materiel acquisition process, and is conducted for a variety of reasons. User tests employ soldiers (individuals, crews and units) who are representative of the ultimate users of new materiel, organization, and doctrine. CDEC is a major performer of user tests. The Army usually subdivides user tests into the following categories.

- Operational Testing (OT). OT, like DT, is part of the materiel acquisition cycle. OT is oriented toward the evaluation of a developmental item as part of an actual troop unit under realistic conditions. The purpose of OT includes the evaluation of military utility, operational effectiveness, logistic supportability, operational suitability, and the desirability of a new item of equipment compared to equipment already in the inventory. Also included are assessments of the need for modification and the adequacy of organization, doctrine and tactics. Data to support cost and operational effectiveness analysis (COEA) and training effectiveness analysis (CTEA) are also gathered. OT is usually conducted in two phases. OT I is conducted to test the achieved or potential operational suitability and effectiveness of the system. It is often combined with DT I to conserve test resources. OT II is conducted toward the end of full

scale engineering development. It tests the operational suitability, military utility, and operational effectiveness of the total system, i.e., hardware, software, combat developments training subsystems, personnel, and logistics to include RAM. OT II is normally more critical in terms of contributing to a decision which will commit Army production funds. For each item, DT and OT are coordinated in a test program prepared by the agency developing the new weapon system or piece of equipment. For some systems an OT III will be conducted during low rate initial production (LRIP) as an aid to the impending full scale production decision.

- Force Development Testing and Experimentation (FDTE). Tests ranging from the small in scope, highly instrumented, high resolution field experiment to the broader, less instrumented, low resolution and more subjective field test are performed to support the force development process. FDTE are scheduled as needed during any phase of development. FDTE may be conducted for developing requirements documents or for developing operational issues, concepts of employment, tactics, training, techniques and organization. Thus, FDTE can be used to determine the specific organization, concepts of employment, training, and support tactics and techniques which are to be evaluated for adequacy during OT of the system. FDTE also include field experiments which are designed to gather data through instrumentation to address a training development, training effectiveness analysis or combat development problem or to support simulations, models or wargames. Requirements for FDTE can be generated by results of other combat developments, training developments or training effectiveness analysis testing and studies.

- Concept Evaluation Program (CEP) tests are innovative tests involving TRADOC DCSTE controlled funds earmarked for the conduct of tests and evaluations on new or modified hardware. CEP provides TRADOC commanders a quick reaction and simplified process for resolving or solidifying combat developments and training developments requirements. CEP tests should not be developed as a means of avoiding the normal testing programs. However, issues satisfied during CEP need not be reexamined during formal OT (and in fact are prohibited from unnecessary or redundant treatment by AR 71-3). Use of CEP to provide an experimental data base for requirements documents and to expedite the materiel acquisition process is strongly encouraged.

• Follow-On Tests and Evaluations (FOE) are tests and evaluations of materiel systems conducted subsequent to the full production decision to provide information regarding unresolved operational issues which are not considered critical to the production decision. The need for and scope of the FOE will be determined by the unresolved issues for test.

• Other types of user testing may be utilized in those cases where previously defined types do not coincide with the materiel acquisition process (MAP) training development and evaluation process and/or the decision point for which the test is required. These types of user tests may include OT IIA, Product Improvement Proposals (PIP), customer tests, or others agreed to in appropriat ' user testing policy documents.

b. Training Development Testing.

(1) Training development testing is conducted for the following purposes:

(a) To assist in the identification, delineation, and solution of training problems.

(b) To evaluate training aids and devices by field experiment.

(c) To evaluate the effectiveness of proposed solutions to training problems by field experiment.

(d) To collect data on the effectiveness of innovative training alternatives to include data from tactical unit experiments.

(e) To evaluate the most cost effective alternative for training.

(2) Procedures for Training Development Testing. Proc edures for training development testing parallel those for combat development testing. Since training development involves the measurement of human responses it is generally more difficult to identify and control variables during this type of testing. Statistically reliable results

with high levels of confidence are likewise more difficult to achieve in training development testing than they are in combat development testing.

2.3 THE SCIENTIFIC METHOD APPLIED TO FIELD EXPERIMENTATION.

a. Among practitioners of military field testing, CDEC enjoys a high reputation for rigorous application of the scientific method to field testing. The term "scientific method" has a broad range of meanings. Basic to them all, however, is the systematic collection, analysis, and documentation of data. CDEC plans and conducts field experiments in which appropriate experimental units are observed while performing typical combat tasks. Conditions are controlled and parameters are varied to produce data in a manner convenient for observation or measurement. Before this can be done, it is necessary to determine what conditions are to be observed.

b. Field experimentation involves the determination of facts and their relationships in a systematic manner by deliberately varying the parameters of interest. Conditions are established, variations are systematially introduced, and results are observed, measured, recorded, and evaluated.

c. The experimental units that constitute the subject of CDEC inquiry comprise man-materiel systems functionally organized into doctrinally prescribed or goal-directed organizations. These military tactical systems are studied component by component and collectively during the project analysis, test planning, detailed test planning, field execution, data analysis, and reporting phases of CDEC experiments.

d. The desirability and necessity of treating experimental units in a systems context has become increasingly evident. This necessity arises as more complex materiel is introduced and a greater depth of understanding is sought. The systems approach makes available a large number of scientific tools and techniques which aid in representing (modeling), analyzing, simulating, and understanding an operational system. The entities which comprise the system are identified, their configurations are delineated, and their relationship and flows portrayed. Decision points are located, possible system states are specified, and weaknesses are noted. The operation and functional configurations of the

system are conceived. Sources of error are traced, and measures of effectiveness and criteria for success are determined. Systems analysis aids in determining the variables to be operated upon, and the meaningful observations which need to be made.

e. The scientific discipline that deals with such complex problems as research or military experimentation in doctrine and tactics is generally known as operations research and system analysis. Systems analysis is a functionally oriented tool for use in operations analysis. Operations Research/Systems Analysis (ORSA) techniques find considerable application at CDEC. References 2.7.a and 2.7.b are standard introductory works on these disciplines.

2.4 SCIENTIFIC SUPPORT LABORATORY.

a. CDEC obtains scientific support by a contract with a civilian agency. This agency staffs the Scientific Support Laboratory (SSL) in the CDEC structure. The complete listing of SSL capability is to be found in the current contract (Reference 2.7.c). The general scope of work of the contract is as follows:

(1) The contractor provides the necessary management, scientific and professional skills, services, and support to establish the scientific design and analysis of CDEC experimentation. Responsibility for setting up the experiment rests with the government. The contractor has the responsibility for recommending to the government what data should be obtained. The contractor may also be tasked for the collection and analysis of data.

(2) The contractor's tasks include: the design of experiments, instrumentation and evaluation procedures, participation in field experimentation, collection and analysis of data, engineering, maintenance and computer software for instrumentation requirements, and the preparation of scientific portions of reports and studies. The SSL is responsible for making recommendations to assure that the field execution of the experiment is carried out according to the design of the experiment and to assure the validity of data collected.

(3) Estimated contractor resources for the scientific effort required in connection with each experiment are submitted to the Commander, CDEC, through the appropriate staff action.

2.5 EXPERIMENTATION CRITERIA AND TERMINOLOGY.

a. An experiment helps solve a problem or answer a question. Such problems or questions are usually stated as hypotheses or assumptions which can be accepted or rejected as a result of the measurements made during the experiment. An experiment must ask how changes in certain variables are dependent on changes in certain other variables. In other words, an experiment is the measuring of changes in some things (dependent variables) to discover how they depend on changes in other things (independent variables). As an example, an experiment might have as a dependent variable the number of target hits per minute, changes in which might depend on changes in an independent variable consisting of the number of riflemen firing at the target. It is often desirable to include a known basis or a unit as a control among those making up the independent variables. For example, a standard rifle might be included as a control against which to measure the relative effectiveness of other weapons. A field experiment must be conducted so that the relationships among variables correspond to those that would be encountered in a real-world military environment.

b. Most experimental measurements should be objective: records of time to accomplish specified tasks, distances (relative position location of opposing force) and frequencies of occurrences of events such as weapon firings. Any one type of measurement is made along a single dimension such as length, time, or hits per minute. The dimension must be scaled; i.e., divided into units to be measured. Defining this level or criterion for measurement is difficult. Subjective measurements (such as records of human judgments, ratings, and evaluations) may be needed to supplement objective measurements. These measurements are identified as subjective judgments in the report of experimentation. Objective and subjective measures must meet the following criteria to provide for answers that will be scientifically acceptable:

(1) Validity. Measurements must actually measure or correlate with the variables they are supposed to measure and not something else.

(2) Generality of Prediction. Experiment measurements must be useful for predicting results in real-world situations.

(3) Reliability. Measurements must be reproducible with substantially the same results by anyone who wishes to duplicate the procedures followed. For this reason, the report of an experiment should provide information concerning the variability of the results obtained.

(4) Statistical Confidence. Any variable measured only once may yield an atypical result. Measurements must be repeated enough times under as nearly identical conditions as possible, in order to produce a reasonable level of statistical confidence in the results.

(5) Sensitivity. In a mathematical sense, sensitivity refers to the degree to which changes in a variable influence other variables or the final result. In the engineering sense, measurements must be made with tools/systems which, without biasing the results, are sufficiently sensitive to record fluctuations or differences in the measures variables.

(6) Control. Experiments must be conducted under conditions which eliminate or minimize extraneous influences which might affect the value of measurements being obtained. In field experimentation this is not always possible because not all variables which exert extraneous influence can be controlled. Those that can be controlled are controlled. For those extraneous variables that cannot be controlled in the field, statistical control can be applied to assure that observations are made on a comparable basis.

c. One of the difficult aspects of field experimentation is identifying problems that can be resolved by experimental methods. Many problems appearing to have simple solutions actually require complex experimental tasks that cannot be controlled; measurement of variables for which no measuring tool is available or require an excessively large number of replications. The experiment designers must be continually on guard to avoid these pitfalls. On the other hand, the experimenter must seek to extend the boundaries of

technology to accomplish more tasks by valid experimentation or seek analytical alternatives to supplement the experimentation process, such as computer simulations. It is important that problem definition be a coordinated effort between the military and scientific staffs at CDEC.

2.6 LEVELS OF DATA ANALYSIS.

a. An important series of discussions which must occur for each field experiment, relate to the size and scope of the analyses that will be performed on the field collected data. These data analysis discussions are based on the wishes of the proponent as counseled by CDEC's military and scientific judgments. The SSL and military operations research analysts provide the technical competence to accomplish the analysis tasks. Procedures for analysis vary widely with the type of experiment, and may extend from the comparison and manipulation of simple averages through complex computer simulations. Frequently the need exists for data analysis concurrent with execution during the progress of major experiments. A first order analysis may be conducted in order that timely recommendations can be made for ending or redirecting the experimental investigation, and for input to interim reports.

b. CDEC uses six levels of data analysis, defined below, to denote the level of refinement to which data may be subjected.

(1) Level 1 - Raw Data. Data at Level 1 are data in their original form. This includes data on:

- Data collection forms used by a controller or data collector.
- Magnetic tape. (This refers to the original tape used during the conduct of the experiment.)
- Camera film, unedited.
- VTR tapes.

- VRS tape, unedited.
- Punch cards or hard copy printouts of the contents of magnetic tape.
- Computer disks.

At this level no data purification has taken place except the elimination of data which are obviously invalid.

(2) Level 2 - Reduced Data. Data at Level 2 have been taken from the raw data form and consolidated for evaluation of data quality. This first level of data refinement is performed soon after the data are collected, usually within 1 day.

(3) Level 3 - Ordered Data. The data in data package reports are generally at Level 3. Few arithmetic operations are applied to data at this level. Data at Level 3 are distinguished from data at Level 2 by the terms "edited" and "ordered." Data at Level 3 have been checked for accuracy and placed in logical order. Data at this level may be produced in one or more of the following forms:

- Ordered computer printout.
- Typed listing.
- Purified and ordered tape.
- Edited camera film.
- Edited VTR tapes.
- Edited VRS tape.
- Punch cards.

Data in this form have been thoroughy purified. Invalid data have been identified and eliminated. The data may be ordered on any of several dimensions such as:

- Specific event or position location data.
- Trials.
- Player elements.
- Time of day.

(4) Level 4 - Descriptive Data. Data at Level 4 have been subjected to any of several elementary statistical and mathematical operations. Data in this form will usually consist of:

- Frequency distributions. Such distributions may be in tabular form, histograms, or curves.
- Computed means, variances and standard deviations of distributions.
- Computed percentages.
- Computed correlation coefficients.

Processing of data to Level 4 does not include drawing inferences. Significance of the difference between any of the measurements is not given. Data at this level differs from those at Level 3 in that they are summarized and combined into more concise measures. Data at this level should not go beyond what may be called "data descriptive" of what happened in the experiment.

(5) Level 5 - Inferred Data. Data at Level 5 have undergone statistical tests of hypothesis or interval estimation. The tests and estimates which are to be made are planned in the test design plan. The design of the experiment is constructed so that the

specific planned tests and estimates can be made. Although there are many tests of hypothesis in the literature, those techniques most often used at this level of data refinement are:

- "Student's" T test.
- Chi square test.
- Snedocor's F test.
- Regression analysis.
- Standard nonparametric tests.

Hypotheses to be tested will include testing whether:

- An observed distribution represents a sample from a standard or known distribution.
- Two or more observed distributions are samples from the same, perhaps unknown distribution.
- A sample estimate of a parameter, such as a mean, median, standard deviation, or regression coefficient, differs from a given fixed value.
- Two or more independent sample parametric values differ from each other. Data at this level do not include statistical inferences on ex post facto questions generated either from an outside source or by the results themselves. Level 5 data are limited to preplanned statistical analyses of the data generated in the experiment.

(6) Level 6 - Analyzed Data. Data at Level 6 have received a more thorough and detailed analysis than at Level 5. Analysis at this level is characterized by two features:

- It answers questions or investigates areas not planned for in the original experiment or,

- It combines the results of the experiment with data obtained elsewhere in order to generalize the conclusions that may be drawn.

A classic example of Level 6 analysis is the insertion of experimentally derived data into a combat model to generate new information to help answer force mix questions. A second example is the use of experimentally derived intervisibility data to determine the probability that a target is available when a tube launched guided projectile arrives. Another way to distinguish analysis at Level 5 and Level 6 is that data at Level 5 are pure data concerned solely with the quantitative nature of the population from which the experimental sample was drawn. Data at Level 6, on the other hand, answer operational questions relative to some broader base.

c. The responsibility of CDEC for data refinement is as follows:

(1) Unless notified to the contrary, Level 1 data representing results of valid trials will be stored for 1 year in the CDEC Data Bank. If after 1 year no additional post experiment requests have been received for this data it is destroyed.

(2) Level 2 data are screened after final report publication, stored in the CDEC Data Bank with Level 1 for 1 year.

(3) Unless notified to the contrary, CDEC generates and publishes complete data at Levels 3 and 4 in the Final Report. Level 3 data are stored for all experiments, indefinitely, in the CDEC Data Bank.

(4) The extent of the Level 5 refinement done at CDEC should be negotiated with the proponent before and during the test design planning subphase. Generally, CDEC expects to do a reasonable amount of clearly defined Level 5 refinement.

(5) Generally CDEC does no Level 6 analysis. Specific requests for such analysis from outside sources are considered on a case-by-case basis.

2.7 REFERENCE.

a. Moder, Joseph J and Elmaghraly, Salah E. (Editors), "Handbook of Operations Research - Foundations and Fundamentals - Vol I and II", Van Nostrand Reinhold Co., 1978.

b. Wagner, Harvey M., "Principles of Operations Research with Applications to Managerial Decisions", Prentice-Hall Inc., 1969.

c. SSL Contract DAAG08-81-C-0119.

CHAPTER 3

THE CDEC EXPERIMENTATION PROCESS

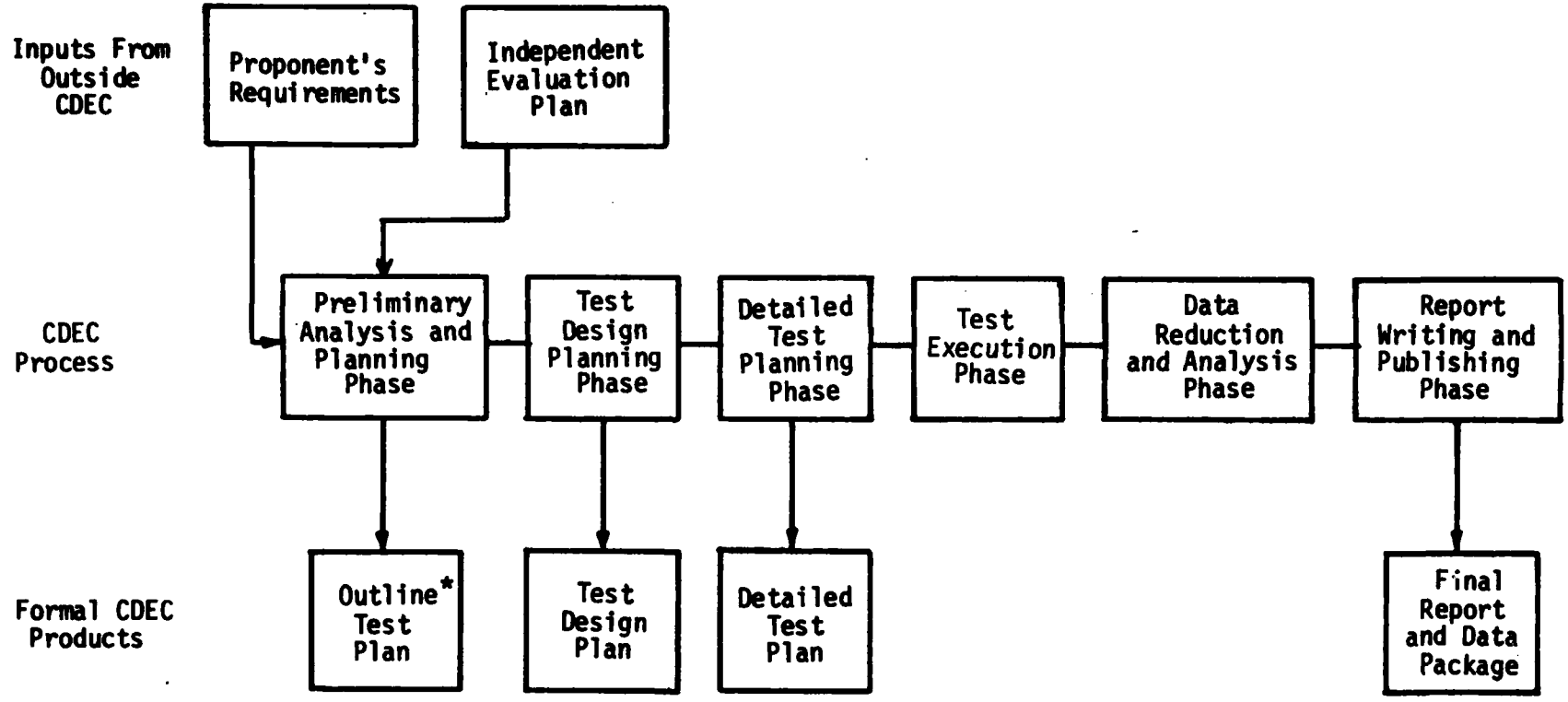
3.1 PURPOSE. The purpose of this chapter is to provide an overview of the process by which a CDEC experiment passes from initial requirement through concept development, to scheduling, detailed planning, field execution, and final reporting. Subsequent chapters provide details regarding each individual major subtask of the CDEC experimentation process. Areas of the CDEC experimentation process which receive detailed attention in a following chapter will be merely outlined here so as to avoid redundancy. Steps in the process which are not the subjects of following chapters will be commented on at greater length in this chapter.

3.2 EXPERIMENTATION PHASES.

a. Figure 3-1 breaks the CDEC experimentation process down into six basic steps or phases: preliminary analysis and planning, test design, detailed test design, test execution, data reduction and analysis, and report writing. The phases in the experimentation process have no definite cutoff points; instead they overlap. Work for each phase is based upon estimates and draft plans made in the preceding steps. In some cases, feedback from forward planning is required before the previous phase can be completed. Throughout this process the military and scientific disciplines are interdependent and complementary.

b. In order to provide the expertise and continuity required for the successful conduct of this experimentation process, an Experimentation Task Group (ETG) containing members from each staff element and from the SSL, is formed early in each experiment. Paragraph 4.8 in Chapter 4 discusses the formation and functions of an ETG.

c. The following six paragraphs address these six experimentation phases.



*Sometimes furnished by OTEA (see para. 3.3.b.).

Figure 3-1. CDEC EXPERIMENTATION PROCESS

3.3 PRELIMINARY ANALYSIS AND PLANNING PHASE.

a. Experimentation Requirements. The CDEC experimentation program is based on both internally and externally identified and directed experimentation/testing requirements.

(1) Force development testing and experimentation (FDTE), operational testing (OT) and joint testing (JT) requirements are identified through the Test Schedule and Review Committee (TSARC) and the Five Year Test Program (FYTP). The TSARC is a general officer committee chaired by the Operational Test and Evaluation Agency (OTEA) which recommends test priorities, coordinates and schedules resources for user testing and resolves conflicts between testing and other missions. The TSARC reviews and recommends draft outline test plan (OTP) for inclusion in the FYTP. The FYTP, upon approval of DCSOPS, is a tasking document for test execution and provides planning guidance for the out-years. The TSARC process is conducted semiannually each year during the period March through July and September through January. DCSTE initiates the process by chairing a TRADOC working TSARC in March and September with representatives from DA, DARCOM, FORSCOM, OTEA, TRADOC proponent centers/schools, TRADOC test organizations, USALOGC, USA Soldier Support Center, CAC and other agencies. The test organizations prepare revisions to current FYTP OTP and new OTP for presentation at the TRADOC TSARC. Following the TRADOC TSARC, appropriate revisions are made to the OTP which are then forwarded to OTEA for consideration during the OTEA working TSARC conducted during May and November. DCSTE represents TRADOC at the OTEA working TSARC. Following the OTEA working TSARC, a DA General Officer (GO) TSARC is held in June and December to consider those issues not resolved during the OTEA working TSARC. The GO TSARC then recommends approval of the FYTP to DCSOPS. In those cases where an OTP must be approved between scheduled TSARC, procedure for submission of out-of-cycle OTP are at paragraph 2-1c (2) of AR 71-3. TRADOC out-of-cycle OTP will be sent by test organizations to all TSARC members with an appropriate statement of test urgency over general officer signature for approval.

(2) CDEC is also authorized by TRADOC Regulation 71-9 to conduct in-house experimentation to develop methodology, instrumentation, and simulation technique

or to obtain otherwise unavailable operational data required as input for a programmed experiment.

(3) Another source of experimentation/testing requirements is the customer test. This is a test conducted by a test organization for a non-TRADOC agency which provides funds and guidance for the test.

(4) All CDEC tests and experiments, other than those described above in paragraph (2), will have a designated external proponent agency. Typical proponents are OTEA, HQ TRADOC, or an agency appointed by HQ TRADOC. HQ TRADOC normally designates the center/school with primary responsibility for the system requirements document as the proponent for test and experimentation involving that system. If the system involves more than one military discipline, HQ TRADOC may designate a lead proponent and cooperative proponent(s). As deemed appropriate by HQ TRADOC, responsibility for test management and/or independent evaluation of systems will be delegated to proponents.

b. Outline Test Plan.

(1) Responsibility. The test organization is responsible for preparing and coordinating an experiment's outline test plan (OTP). CDEC is usually designated as the test organization for FDTE projects, and for operational tests of non-major (Category 2, 3, or 4) systems. OTEA is usually the test agency for major (Category 1) system's operational tests. For DOD joint tests, OTEA or a Joint Task Force will be the designated organization. Since one of the major functions of an OTP is to specify the test player, support personnel, and the instrumentation requirements of a test, even in those cases when CDEC is not the designated test organization, it will remain an essential contributor to the OTP preparation process. Within CDEC, DCS, Plans has the principal OTP responsibility.

(2) Preparation. When given the responsibility for OTP preparation CDEC, in coordination with the test proponent and the Combined Arms Center (CAC), will develop and refine the purpose, objectives, and the scope/tactical context for the test.

Estimates of personnel and equipment support requirements will be developed, and duration and overall costs of the test calculated. The test resources estimates have become increasely important in recent years as outside agencies are less and less willing to vary their commitment of personnel or other resources from the values set down in the approved OTP. Of particular importance for FHL based experiments is obtaining an early as possible agreement with the 7th Infantry Division on terrain requirements - both area and execution dates. Within CDEC, Inst Cmd (Prov) needs to be consulted during OTP preparation regarding the test's requirements for new or modified instrumentation.

(3) Format. The OTP must meet format requirements as described in AR 71-3 and in the Outline Test Plan Preparation Handbook (Ref. 3.9.a). Annex 1 to Appendix A provides the latest (24 February 1981, Ref. 3.9.c) requirements from OTEA on the format and context of an OTP. It is anticipated that further OTP guidance will be reflected in the forthcoming TRADOC Pamphlet 71-9. Occasionally a non-CDEC agency will, in lieu of an OTP, produce a resume sheet (RS) — see Appendix G. CDEC does not use resume sheets in its experimentation process.

c. Experiment Scheduling and Programming.

(1) Programming is defined as the allocation of a block of time within which a specific experiment, test, or other activity is planned to be accomplished. Scheduling is the designation of specific dates within the programmed block of time when the various phases of an experiment, test, or other activity will commence and be completed. The DCS, Plans is responsible for programming, training, analysis, and the development of concepts and test design plan. Instrumentation Command (Prov) and DCS, Experimentation (DCSEX) assume staff responsibility for further planning, execution, reporting, and related activities upon approval of the concepts and the test design plan.

(2) The DCS, Plans has staff responsibility for preparing, coordinating and submitting a recommended experimentation program to the Commander's Policy and Review Board for approval. The program includes all experiments, tests, and activities submitted from internal and external sources for conduct by CDEC. This program projects the experiments to be conducted by fiscal year, identifies a support combat

developments program, and lists the purpose and objectives of each experiment. The DCS, Plans also has staff responsibility for preparing the test design plan (see Chapter 4) for experiments that have been approved by the TSARC for inclusion in the CDEC Experimentation Program.

(3) Upon approval of the test design plan for an experiment, the DCSEX assumes responsibility for all subsequent planning, coordination, and activities necessary to execute and report on experiments. The DCSEX is responsible for preparing and coordinating the Personnel and Materiel Requirements Document (PAMRD). The DCSEX is also responsible for preparing, coordinating, and submitting a recommended detailed test plan (DTP) (see Chapter 5), changes thereto, and a final report of the Commander's Policy and Review Board.

(4) The Instrumentation Command (Prov) has staff responsibility for instrumentation support of field experimentation to include development, installation, maintenance and operation of instrumentation systems. IC also prepares specifications for procurement of instrumentation systems necessary for experimentation and conducts feasibility tests, acceptance tests, and engineering evaluations for instrumentation systems.

d. Experimentation Numbering System.

(1) Since August 1973, CDEC experiments have been assigned the OTEA identifier used in the FYTP. CDEC field experiments are identified by the letters FC, followed by three digits which continue in sequence; e.g., the first field experiment to use this numbering scheme, Attack Helicopter, Clear Night Defense, is identified as FC 001. Joint tests are identified by the prefix JT, followed by a three digit number; thus TETAM III is identified as JT 003. In order to retain the ability to identify related experiments, CDEC uses a short word title or acronym in conjunction with the OTEA identifier, e.g., Experiment TIE (Training Instrumentation Evaluation) or PARFOX VII (Evaluation of the Parapet Foxhole, Part 7.)

(2) When CDEC is tasked to provide support to other agencies conducting experiments in the Fort Ord/FHL area, a prefix of ES (for "experimentation support"),

followed by three digits, is assigned. In the event that CDEC conducts an internal methodology experiment, a two letter, three digit identifier and a descriptive word title is assigned. The letters ME indicate "methodology experiment" and the digits, beginning with 001, denote the sequence in which the experiment entered the experimentation program.

(3) Prior to 1973, a CDEC experiment number had two digits to the left of the decimal point and a number to the right. The first digit denoted the series which specified the area of experimentation while the second digit classified the type of experimentation within the area of experimentation. The areas of experimentation were as follows:

Series	Area of Experimentation
10	Mounted Combat Operations
20	Dismounted Combat Operations
30	Indirect Fire Support Operations
40	Army Aircraft Operations
50	Combat Support Operations
60	Data Research and Correlation
70	Special Projects

Types of experiments were categorized according to the following system:

Number	Types of Experimentation
1	Live-Fire
2	Non-Live
3	Two-sided evaluation
0	Any combination of 1, 2, 3

A number to the right of the decimal point was the sequence number of the experiment within the area and type of experimentation.

3.4 TEST DESIGN PLANNING PHASE.

a. This phase consists of the production, approval, and publication by CDEC of an approved test design plan (TDP). Chapter 4 is devoted to a detailed discussion of this phase. CDEC has responsibility for preparing TDPs for FDTE and OT, Category 2, 3, and 4 tests. OTEA has principal responsibility for Major, Category 1 OTs, and joint tests. TDPs are the responsibility of the JTD. In most of these latter cases, CDEC will be a major participant in TDP preparation.

b. CDEC's role in the production of the IEP is not, as Figure 3-1 seems to indicate, merely that of a passive recipient of this document. All possible assistance is furnished through DCS, Plans to the writers of the IEP. Continuous two-way communication enhances CDEC's knowledge of what the proponent really wishes to obtain from the test, and furnishes the proponent some insight into the nature and limitations of the answers that field experimentation provides. CDEC's experience with different instrumentation systems and field operational procedures can be of particular value at this point in the experimentation process.

3.5 DETAILED TEST PLANNING PHASE.

a. With the publication of the approved TDP, the experimentation process undergoes a shift in emphasis. Up to this point in the process CDEC tends to look <u>outward</u>, interacting with the proponent in order to develop an experiment design which will validly address the proponent's needs. After the TDP's completion and approval, CDEC will more often look <u>inward</u>, addressing the instrumentation and operational challenges it must meet in order to successfully execute this experiment in the field and produce a final report within the agreed upon time schedule. Of course, this is merely a change in emphasis. Since methodology, instrumentation, and software design require the longest possible developmental lead times (especially for experiments requiring complex instrumentation), these efforts are usually underway well before the end of the TDP phase. Likewise, the interaction between CDEC and the proponent continues throughout the entire experimentation cycle.

b. As illustrated in Figures 4-8 and 4-9 of Chapter 4, CDEC acknowledges the change in emphasis at this point in the experimentation process by transfering leadership of the Experimentation Task Group from DCS, Plans to DCS, Experimentation. DCS, Experimentation's first task as leader is to initiate the writing of the detailed test plan (DTP). Chapter 5 discusses in detail the development of the DTP. The DTP will take the TDP as its major source document. It will, in fact, borrow several TDP annexes in toto. Unlike the TDP, the DTP is not designed for distribution outside the command. It is a CDEC-internal document intended to function as a blueprint for the field execution. Chapter 5 of this manual is devoted to the detailed test planning phase.

3.6 FIELD EXECUTION PHASE.

a. This phase is the centerpiece of the CDEC experimentation process. It is the phase for which all the planning has been made and upon which all the reporting and analyses will be based. Most of the experiment's cost in man-hours, material and money takes place during field execution. Large experiments, such as TASVAL, may involve several thousand people in the field execution phase. Strict and responsive operational and data quality control procedures are necessary in order to achieve the design goals in a given time frame.

b. The field execution phase can be roughly divided into three stages:

(1) Pre-Exploratory. A period of instrumentation, software, and methodology checkout before the beginning of formal exploratory trials.

(2) Exploratory Trials. A series of trials run, at first on a reduced scale, then later "full-up," designed to validate the instrumentation, software and operational procedures of the experimentation design.

(3) Record Trials. These trials provide the official data that will form the basis of all official end products of the experiment. Each trial run during this phase is subject to a validation process which ascertains whether the trial was executed validly and thus should have its data included in the official record.

c. Chapter 6 provides additional details on the field execution phase.

3.7 DATA REDUCTION AND ANALYSIS PHASE.

a. The data reduction and analysis phase consists of the execution of the data reduction plan and the analysis plan. The product of this process will be test results in the form of findings, assessments, and suggested improvements. These test results have great potential impact on the decision making process. They must be thoroughly considered and great care should be exercised in their formulation. Rationale for results should be recorded to facilitate report writing. Data reduction and analysis will be accomplished in two subphases.

b. Data reduction and analysis consists of processing raw, Level 1 data into findings and/or assessment (Levels 3, 4, 5, and 6). The levels of data and their relationship to the reduction and analysis process and the categories of test results are defined in Para 2.6.

(1) The data reduction subphase consists of data processing through Level 4. When practical, this process begins during the test execution phase (or as soon as raw data becomes available), rather than waiting until the test execution phase has been completed. At the conclusion of the data reduction subphase a Technical Data Review, chaired by the Scientific Advisor, will be held to review the data and the planned methodology for data analysis. Data will be made available for this review in all Levels 1 to 4 to enable reviewers an opportunity to trace the development of data reduction. Data will be retained in all forms from Level 1 to Level 6 until after the test report has been published.

(2) Data analysis consists of performing those analytical techniques defined in the Data Reduction and Analysis Plan or approved by the Technical Data Review. Normally this subphase involves the use of inferential statistics and the application of logic, common sense, and military judgment to data of Levels 3, 4, and 5 for the purpose of identifying findings, making assessments, and suggesting improvements.

3.8 FINAL REPORTING PHASE.

a. Final reports of experimentation are CDEC's most widely distributed and visible product. Many CDEC reports have had significant impact on the organization and operation of the Army and on the procurement of expensive weapon systems. It is essential that the content of a test report - both mathematical and verbal - be carefully checked, and that the writing and editorial considerations of the report be of the highest quality.

b. An experiment may produce published end products in addition to the test report. Data packages containing selected experimentation data (usually Level 3 or 4) and other supplemental information often have proven to be extremely useful in providing readily accessible data for future analyses. In addition to or as an alternative to the data package report, CDEC is often called upon to furnish copies of some or all of the reduced data to the proponent. The analysis level of these data (see Para 2.6) and the transmission media (computer tapes, cards or listings) are determined on a case-by-case basis. Many of the larger experiments have included publication of CDEC military observations reports. These reports emphasize non-quantifiable observations and judgments - based on experiences during the field execution of the experiments - on military training, tactics, materiel, and other matters. Experimentation critiques are documents designed for CDEC-internal distribution which attempt to enhance the efficiency of future field experimentation through constructive discussion of problems encountered during the conduct of an experiment.

c. The final step in the CDEC experimentation process is to turn over the experiment's data base to the CDEC Data Bank. This step is not merely a casual turning over of the residue from the reporting phase to the Data Bank. A series of meetings between the project team and the DCS, Plans data management officer will be held to produce an agreement on what data at what level will be retained (Chapter 7 and Appendix C furnish some guidelines for this). The data which are transmitted to the Data Bank for storage are in a retrievable format accompanied by full documentation.

d. Chapter 7 provides additional details on the report writing phase. Appendix A discusses report formating and editorial considerations. Appendix C discusses the CDEC Data Bank requirements.

3.9 CDEC INSTRUMENTATION.

a. The operation of CDEC's instrumented electronic battlefield range during a Real Time Casualty Assessment field trial is illustrated in Figure 3-2. As shown, CDEC can simulate in a field experiment the interactions of almost all friendly and threat ground, air (helicopter and fixed wing), air defense, or indirect fire weapon systems. Individual infantrymen may also be played. The basic instrumentation components of the CDEC range are:

(1) Range Measuring System (RMS). A microwave multilateration system which provides player position at any given time, and also telemeters player performance events to the central computer.

(2) Direct Fire Simulator (DFS). Eyesafe lasers mounted on weapon gun tubes, etc., which can illuminate special sensors attached to all player systems. Both laser fire and sensor illumination events are telemetered through the RMS to the central computer immediately upon occurence.

(3) Multiple Computer System (MCS). The CDEC large scale central computer which collates and records the trial data, assesses field casualties in real time, and sends controlling messages back through the RMS to the player systems. Most data reduction and analyses are also done on this computer.

(4) Close Circuit Television (CCTV). Usually mounted on weapon systems for posttrial data verification, the CCTV and the voice recording system (VRS) can record (with time tags) audio data from players or data controllers.

(5) Engagement Line-of-Sight System (ELOSS). A microwave system for indicating the existence/nonexistence of line-of-sight (intervisibility) between two player systems at any given time.

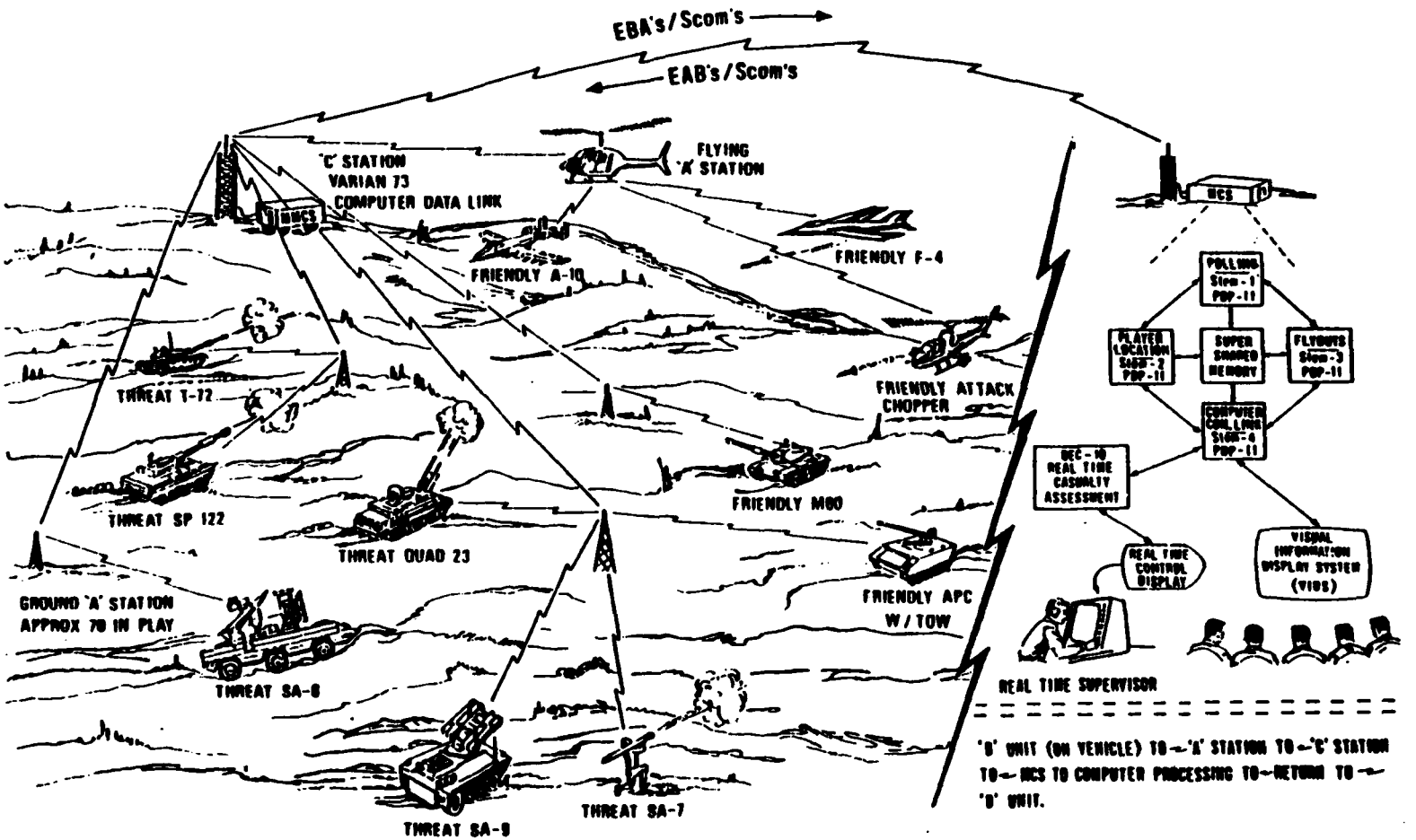


Figure 3-2. REAL TIME CASUALTY ASSESSMENT INSTRUMENTATION OVERVIEW

(6) Supplementary Instrumentation. CDEC also possesses a full inventory of supplementary instrumentation such as photometers.

b. Non-RTCA experiments may use all or some of the above listed instrumentation systems or may rely wholly or partially on manual data collection techniques.

c. A more detailed summary of CDEC's instrumentation capabilities is contained in Chapter 3 of the Real Time Casualty Assessment Handbook (Vol I), (Ref. 3.9.c).

d. The maintenance and improvement of CDEC's instrumentation capabilities is a mission of the Instrumentation Command (Prov.). The Instrumentation Required Operational Capabilities (IROC) document is produced annually by DCS, Plans, Methodology, with IC assistance. The purpose of the IROC Program is to define required instrumentation capabilities for future CDEC experiments and to provide out-year guidance for CDEC's Instrumentation Master Plan (IMP) and Five Year Instrumentation Program (FYIP).

e. Many changes and improvements in CDEC instrumentation systems arise on an ad hoc basis out of the specific requirements of individual experiments. In these cases, the experiment planner should investigate the possibility that this new requirement can be modified so as to be met by existing CDEC instrumentation. An existing system will have a lower cost and is usually superior in reliability to a new, unproven one. If new or significantly modified instrumentation is necessary, IC must be brought into the planning process as soon as possible in order to comment on the feasibility of meeting the new requirements. This includes such considerations as the development of the instrumentation design concept, the actual design and construction (or procurement) of the new instrumentation, and the testing of this instrumentation both separately and as an integral part of the experiment's full instrumentation package.

f. Few experiments are fielded at CDEC without some modifications being required in the existing instrumentation and data processing software. Here too, the experiment planner should strive to firm-up the requirements early and provide IC the longest possible lead times in order to implement these modifications.

3.10 REFERENCES.

a. USACDEC, Outline Test Plan Preparation Handbook.

b. AR 71-3.

c. Memorandum, US Army Operational Test and Evaluation Agency, COL White, Ulysesses X., Subject: "OTP Format Standardization Process", February 1981.

CHAPTER 4

TEST DESIGN PLAN

4.1 GENERAL. This chapter presents a detailed discussion of the phase of the CDEC experimentation process that is centered around the production and publication of an experiment's test design plan.

4.2 PURPOSE OF THE TEST DESIGN PLAN.

a. The purpose of the test design plan is to state what is to be tested, the conditions of the test, requirements for data, analysis logic and a feasible execution concept.

b. Producing a test design plan is a problem solving process which develops the experimentation design and identifies resources for an experiment based on the OTP and IEP. This process begins with the coordination between the proponent and Project Analysis (PA) Division of DCS, Plans in the development of an OTP, and ends with the test design plan (TDP). The TDP is developed by CDEC and coordinated with the test proponent, appropriate integrating center and other interested activities prior to forwarding to HQ TRADOC for approval. The TDP provides input to the DCS, Experimentation for the detailed test plan (DTP).

c. The DCS, Plans is responsible for the development and publication of the TDP for all programmed experimentation. The reporting process includes the staffing of the TDP and the conduct of a Policy and Review (P&R) Board to obtain the commander's approval of the TDP. Proposals for rapid-response, unscheduled experiments are referred to DCS, Experimentation for preparation of all test design/detailed test plans and submission of same to the commander's P&R Board for approval. Project Analysis Division assists DCS, Experimentation in this effort. Close coordination with other CDEC planning elements during the preparation of the TDP is essential to insure that resources and support can be provided.

d. Figure 4-1 depicts the process for CDEC experimentation planning in DCS, Plans.

4.3 OVERVIEW OF TEST DESIGN PLAN DEVELOPMENT.

a. The procedures for preparing a test design plan include five basic steps: (1) coordination, (2) research, (3) design, (4) report preparation, and (5) approval.

b. Initially, coordination is established with the proponent agency to assist in the formulation of the OTP and to develop the purpose, objectives, issues, scope, and measures of performance. This initial coordination is essential to insure that the proposed project is suited for execution by CDEC and that there is a clear understanding of the data requirements. To insure that timely responses to the requirements of the project are provided, contacts are also established with other interested agencies who will participate in the project, or provide troops, equipment or expertise. The concept of the experiment is developed from the information gained in this coordination phase.

c. Research is required to: (1) establish familiarity with the system or operations to be tested, (2) to establish the relationship of the project to other projects, (3) to examine the results of relevant past experimentation, (4) to develop a suitable statistical design, and (5) to project resource requirements. Design parameters are identified from the research effort.

d. The design of experimentation consists of two basic parts. These are (1) experimentation design, and (2) resource requirements to support the design. The design parameters are derived as a result of the coordination and research. Included in the experimentation design are procedures for data quality control and validation.

e. Figure 4-2 depicts the interactions that should occur during the development of a test design plan.

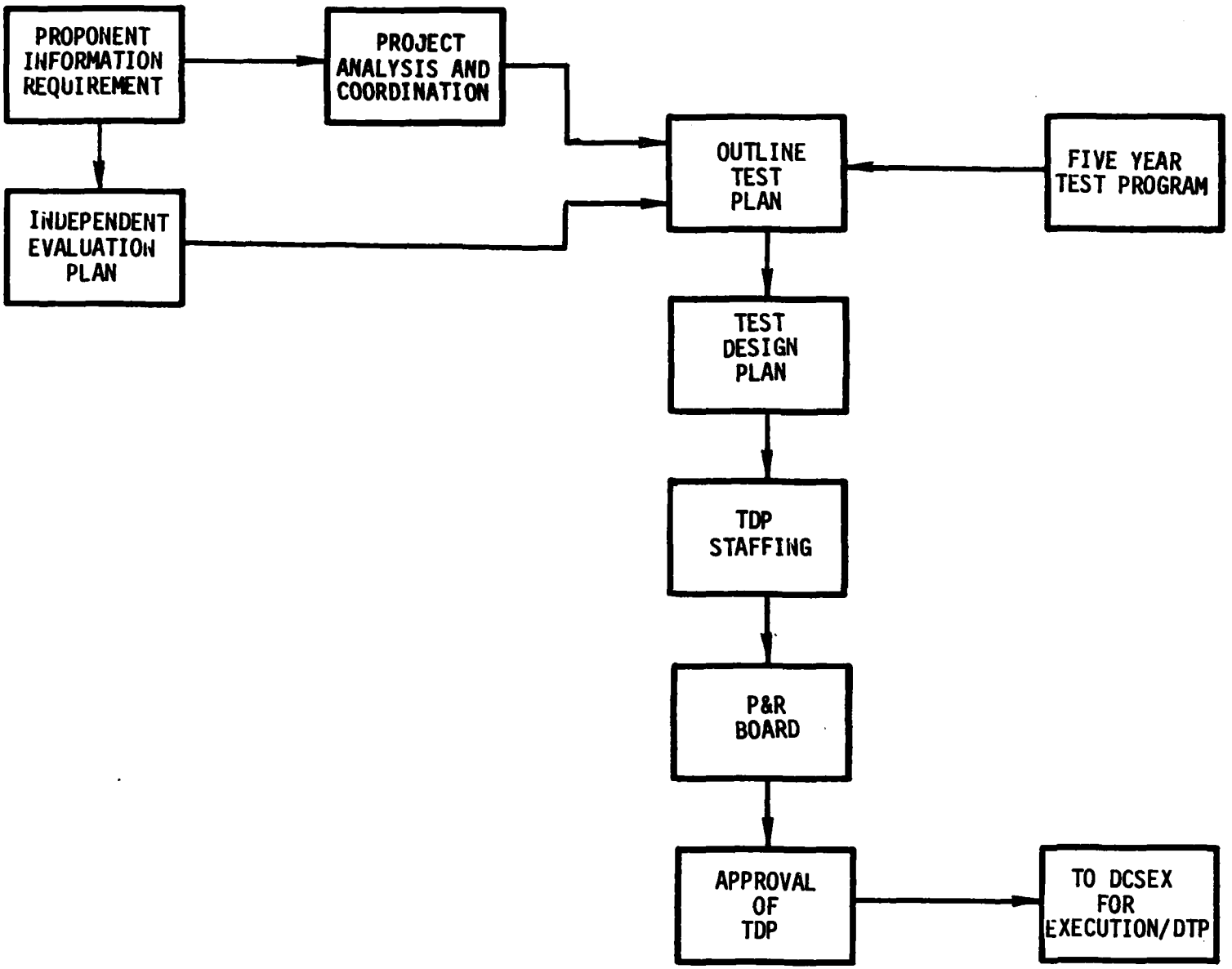


Figure 4-1. PLANNING PROCESS.

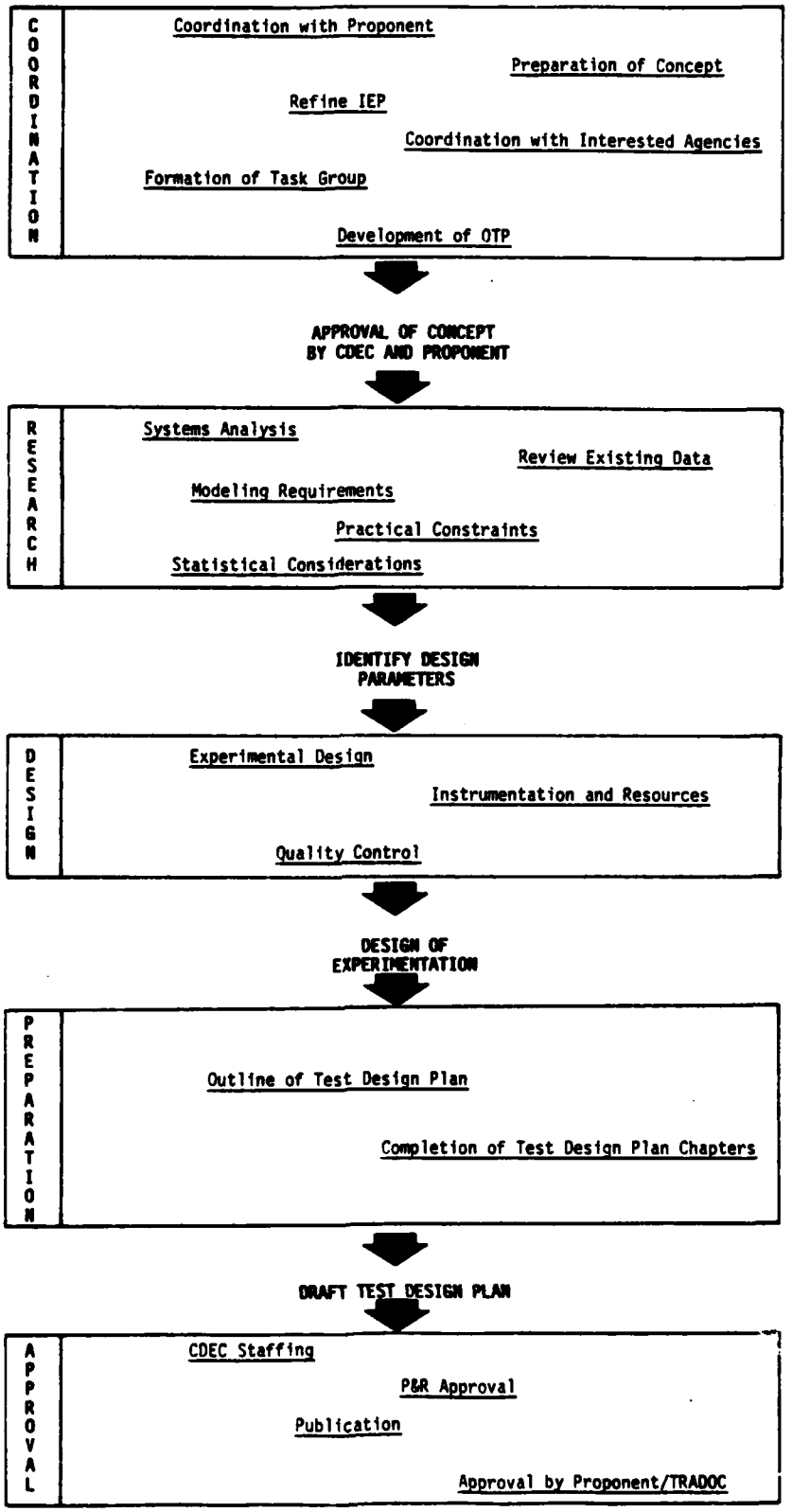


Figure 4-2. TEST DESIGN PLAN DEVELOPMENT

4.4 DEVELOPMENT OF EXPERIMENTATION DESIGN.

a. The development of a feasible experimentation design is the central objective of the test design process. There is no set procedure for the development of an experimentation design; however, there are general considerations that can be applied to most experimentation. All experiments are practically constrained by such things as:

- Time.
- Resources (materiel, personnel, instrumentation).
- Test facilities.
- Costs.

b. Additionally, it may be extremely difficult in a large experiment to identify a manageable group of parameters which truly addresses the objectives and lends itself to the collection of data.

c. The coordination phase serves to closely define the objectives and data requirements of the experiment. The research phase serves to identify parameters that will answer the objectives and to identify a methodology for the collection of the required data. Once the parameters and methodology have been identified, the statistical design for the experiment can be developed to meet the required confidence level. The statistical design provides the number of trials to be executed under each condition of the experiment. At this point, it may be necessary to consider trade-offs and the establishment of data priorities because of a practical inability to execute a design which meets all of the statistical requirements.

d. The final experimentation design is the result of a succession of refinements within the constraints imposed on the experiment. Procedures are developed for:

(1) Data collection, reduction, analysis, and storage.
(2) Quality control and trial validation.
(3) Site layout.
(4) Human Factors considerations.

(5) Environmental impact considerations.

4.5 RESOURCES AND COSTS.

a. The basic cost and resource estimate for each experiment must be included in the approved OTP. However, the substantial additional study and planning that goes into the production of the refined test design for publication in the test design plan may alter the actual resource requirements of the experiment. A new detailed cost and resource estimate should be made for the experiment after the detailed design has been developed. The following procedures should be used.

(1) Beginning with the experimentation design, determine the player equipment and personnel required to execute each type of trial in the experiment.

(2) Determine the number of trials in which each player will be allowed to participate and estimate the number of trials that can be executed on each experimentation day.

(3) Estimate the number and type of support personnel that will be required to support the experiment.

(4) Estimate the total SSL resources required for preparation and execution, analysis, and reporting.

(5) Identify any support equipment that may be necessary.

(6) Identify the sources for all equipment and personnel (CDEC, outside CDEC).

(7) Determine the total number of personnel required for the experiment and the man-days of TDY required.

(8) Identify equipment that will be chartered to CDEC for the experiment (simulators, expendable supplies, etc.).

(9) Identify instrumentation systems necessary for the execution of the experiment by player type and quantity.

(10) Determine environmental impact and resources necessary for restoration.

b. When the above procedures have been completed, all resources required for the experiment have been identified and a detailed budget estimate can be calculated.

c. Figure 4-3 shows the basic experimentation resource requirements, such as time needed for execution, player personnel required, instrumentation required, and how these translate into specific categories of resource requirements. If the detailed resource requirements differ significantly from those published in the approved OTP, the affected outside agencies must be contacted and a revised OTP should be prepared.

4.6 REPORT PREPARATION, STAFFING, AND APPROVAL.

a. The test design plan is formulated using distinct chapters and appendixes, certain portions of the writing, staffing, and approval procedures may be accomplished concurrently.

b. Once sufficient coordination, research, and design has occurred in the development of a test design plan, a subject outline is prepared by the ETG to develop chapters and appendixes for the outline.

c. These chapters and appendixes form the first complete draft of the test design plan. This draft is then printed and staffed within CDEC. When all comments and/or recommendations have been incorporated, resolved or identified for resolution by the Commander's Policy and Review (P&R) Board, a revised draft is published so that it can be distributed to all members of the P&R Board at least five working days prior to the meeting. A transmittal DF briefly presents the significant comments that have been incorporated as well as those identified for P&R Board resolution. Once a draft test design plan has been completely staffed, it is presented in a formal briefing to the Commander's P&R Board (the CDEC approving authority for all test design plans).

EXPERIMENTATION DESIGN

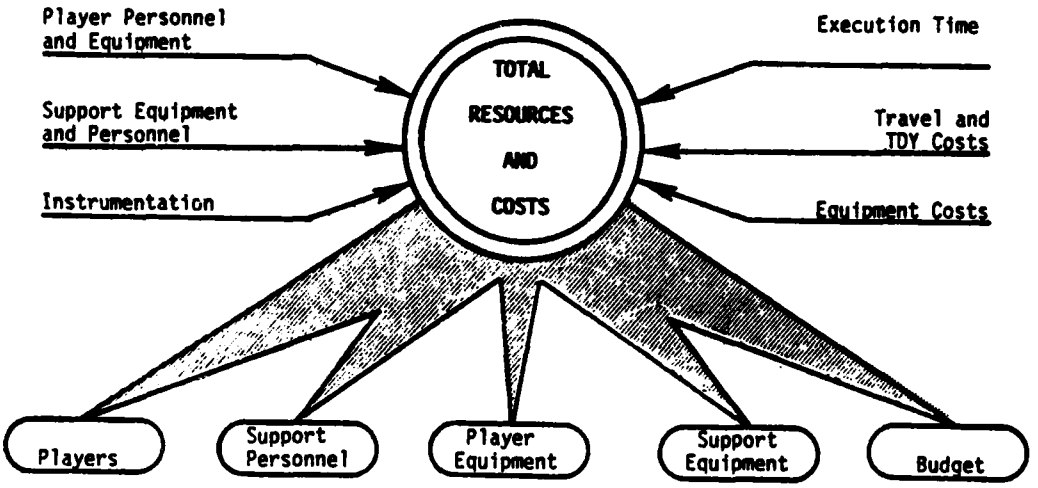


Figure 4-3. RESOURCES AND COSTS

d. TRADOC Reg 71-9 specifies that a TDP be coordinated with the proponent, LOGC, Soldier Support Center, Training Support Center, HQ TRADOC TRASSO and Safety Officer, CAC and other appropriate entities. Every CDEC TDP must receive formal approval from the Commander, CDEC. Depending on the individual project, some TDP's may require additional approvals from DCSTE, OTEA, or the test proponent.

e. Figure 4-4 is the TDP preparation and staffing flow chart.

4.7 TEST DESIGN PLAN CONTENT AND FORMAT.

a. The content of the test design plan is tailored to the requirements of the experiment. However, for the purpose of enhancing communication, TRADOC has specified a standard format into which the content must be fitted.

b. The basic reason for selection of material to be included in the TDP is to provide the approving authority with the information required for the approval of the experiment. However, it must also provide DCSEX with design information for the detailed test plan. Annex 2 to Appendix A of this manual presents the format in which test plans are published. This format, derived from TRADOC Reg 71-9 includes topics which should be considered for inclusion in each TDP; however, the exact topics are recommended by each ETG for each experiment. This format contains the required information for approval in topic areas that allow for development of some portions of the DTP by direct extraction from the TDP. The DCSEX can then provide additional information necessary to execute and report the experiment.

4.8 THE EXPERIMENTATION TASK GROUP.

a. The experimentation process extends from preliminary and planning phases to the approval of the final report.

b. The most efficient way to provide the expertise and the continuity required for the successful completion of this process is through the task group approach. The

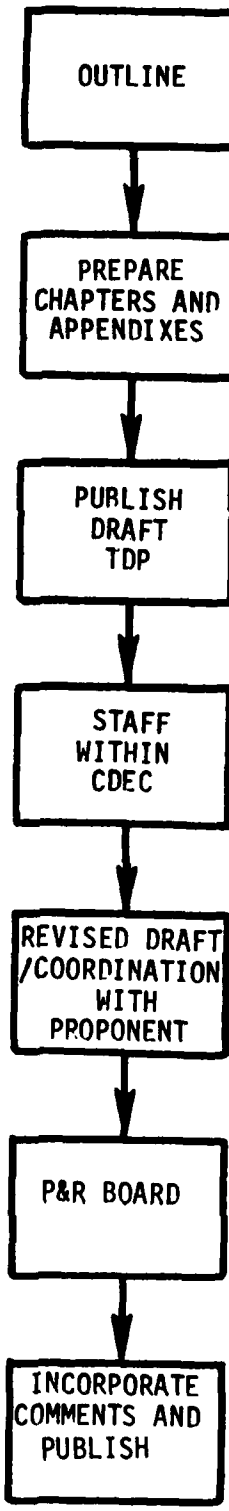


Figure 4-4. TDP PREPARATION AND STAFFING

Experimentation Task Group (ETG) is a group of experts from the CDEC staff sections representing various highly specialized fields (operations research, experimental design, instrumentation, human factors, field operations, logistics, etc.) working together under a chairman to develop the concepts and plans by which to conduct and report a field experiment.

c. The ETG's membership (see Table 4-1) and the responsibilities of the members varies with the different phases of the process. The ETG is formed by the submission of a DF to the heads of all staff sections who will provide representatives. This DF contains the following information:

- Title.
- Brief background statement.
- References, if appropriate.
- Projected/requested execution time frame.
- Time and place of initial meeting.
- Request for name(s) of designated member(s) from all sections.
- Topics of discussion.

d. A limited membership group is formed, when the experiment is first proposed to CDEC, to develop a concept and to recommend to the Command Group whether or not the requested experiment could and should be conducted by CDEC. Once an experiment is accepted and the time for OTP development approaches, the ETG reaches full membership. The use of the ETG during the preliminary analysis and planning phases insures that the OTP is fully coordinated within CDEC, that all resources necessary to execute the experiment are identified, and that actions requiring long lead times are initiated. During the test design phase, the ETG develops, refines, and publishes the test design plan. Test design is a problem solving process which finalizes the experiment design, the general conduct, and the resource requirements. This phase terminates with the approval and publication of the test design plan.

e. The DCS, Plans, Project Analysis Division (PAD), has overall responsibility for both preliminary analysis and TDP phases and exercises influence by appointing the Group

Table 4-1. EXPERIMENTATION TASK GROUP ORGANIZATION

SECTION	PRELIMINARY ANALYSIS	OUTLINE TEST PLAN	TEST DESIGN PLAN	DETAILED TEST PLAN	FINAL REPORT
DCSPLANS	PR	PR	PR	P	P
DCSEX	P	P	P	PR	PR
IC (Prov)	P	P	P	P	P
DCSPER		P	P	P	M
DCSLOG		P	P	P	M
DCSRM		P	P	P	M
ESC		P	P	P	M
SA	M	M	M	M	M
SSL	P	P	P	P	P

PR = Primary Responsibility P = Participate/Assist M = Monitor

Chairman, monitoring progress, and giving guidance when required. The results or products of these phases are briefed to the Commander or the P&R Board by the ETG Chairman for decisions or approval.

f. When the TDP is approved, the overall responsibility for experimentation shifts to the DCS, Experimentation (DCSEX) who appoints the ETG Chairman (usually the project team chief). The project team now coordinates directly, or through DCSEX divisions, with supporting agencies while planning, executing and reporting the experiment. However, the DCSEX Chairman convenes the ETG in accordance with DCSEX policies to provide whatever assistance the project team may require. The original personnel from each staff section should remain on the ETG throughout the experimentaion cycle to insure continuity from the initial concept to the final report.

g. During the detailed test plan, execution, and data reduction and analysis phases, the concepts and methodologies developed in previous phases are translated into field execution. Although the TDP is written as precisely and unambiguously as possible, there may be a need for minor changes which can be approved by the ETG. If the changes are major, the ETG Chairman initiates an IPR and briefs the P&R Board.

h. The final report phase includes all actions taken following completion of the field execution. During this phase, all ETG members assist the project team, as necessary, in the preparation of the final report. The project team is directly responsible for preparation of the final reports. If required, the DCSEX Chairman formally convenes the ETG during the final report phase to assist the project team in preparation of the final reports. Chapter 7 and Appendix A provide additional guidance concerning the preparation of final reports.

i. Tasks that must be accomplished in the experimentation process are listed on the following pages (Figures 4-5 through 4-9). These tasks are not all inclusive and may be changed or added to as necessitated by changes in the experimentation process. In addition to the responsibilities indicated, the chairman of the ETG has the authority to task members for pertinent inputs which lie within the normal areas of responsibility of

the member's staff section. A record of these special taskings is included in the minutes of the ETG meetings. The listing of these task assignments in Figures 4-5 through 4-9 under the column heading "RESPONSIBLE" is not meant to contradict the fact that the overall responsibility for OTP and TDP preparation lies with DCS, Plans. Responsibility for the DTP, field execution, and test reporting lies with DCS, Experimentation.

4.9 REFERENCES.

a. TRADOC Regulation 71-9, "Force Development - User Test and Evaluation," May 1981.

b. Hicks, Charles R., "Fundamental Concept in the Design of Experiments," Holt, Resehort, and Winston, 1973.

c. TRADOC Pamphlet 71-3, "Combat Development Writing Guide."

TASK	RESPONSIBLE	COORDINATE	INFORMED
1. Coordinate w/proponent for experiment and data requirements	PL		EX, IC, SA
2. Develop initial concept	PL	EX, IC, SA	
3. Develop initial design matrix	PL	EX, IC, SA	
4. Determine applicable instrumentation system	IC	PL, RM	EX, SA
5. Determine new methodology requirements	PL	IC	EX, SA
6. Identify unique equipment required	PL	EX, IC, LOG	
7. Determine environmental constraints	LOG	PL, EX, IC	
8. Basic research (previous work)	PL		EX, IC
9. Identify unique personnel required	PL	EX, IC, PER	ESC
10. Identify experimentation terrain requirements	PL	EX, IC	
11. Determine CDEC capability to conduct experiment	PL	EX, IC, PER, SA, ESC	
12. Recommend position on experiment request to Command Section	PL	EX, IC, SA	ESC

Figure 4-5. PRELIMINARY ANALYSIS AND PLANNING PHASE (CONCEPT DEVELOPMENT)

	TASK	RESPONSIBLE	COORDINATE	INFORMED
1.	Establish ETG	PL	EX, IC, ESC, PER, LOG, SA	
2.	Coordinate w/proponent (purpose, objectives, time frame, etc.)	PL		EX, IC, RM, SA
3.	Open TRMS file	RM	PL	EX, IC, SA
4.	Determine methodology development/testing	PL	EX, IC, SA	PER, RM
5.	Environmental assessment	LOG	PL, EX, IC	ESC
6.	Wargame Execution Concept	EX	IC, ESC	SA
7.	Identify type, quantity, and source of player personnel	PL	PER, ESC	EX, IC, RM
8.	Identify type, quantity, and source of support personnel	PL	ESC, IC, PER,	LOG, EX
9.	Identify type and quantity of player equipment	PL	EX, LOG, ESC	IC
10.	Identify source and make initial coordination for player equipment	LOG	EX, IC, ESC, PL	RM
11.	Identify type and quantity of support equipment	PL	PL, IC, LOG, ESC, EX	
12.	Identify source and make initial coordination for support equipment	LOG	EX, ESC, PL	RM

Figure 4-6. PRELIMINARY ANALYSIS AND PLANNING PHASE (OTP DEVELOPMENT)

	TASK	RESPONSIBLE	COORDINATE	INFORMED
13.	Identify type, quantity, and source of instrumentation equipment	IC	PL	EX, LOG
14.	Identify and coordinate data requirements	PL	EX, IC, SA	
15.	Identify type and quantity of ammunition/ munitions and submit forecast to DCSLOG	PL	EX, IC, LOG	ESC
16.	Submit forecast for ammunition/munitions to outside sources as required	LOG	PL	EX, IC, ESC
17.	Identify type and quantity of munition simulators required	PL	EX, IC, LOG	SA
18.	Identify source and make initial coordination for munition simulators required	LOG	PL, EX	IC
19.	Initial budget (Cost Estimate)	PL	EX, IC, PER, LOG, ESC, RM	SA
20.	Initial coordination of engineering construction requirements	PL	EX, LOG	IC, ESC
21.	Determine POL requirements	PL	EX, LOG, ESC	
22.	Establish Test Schedule (milestones)	PL	EX, IC, PER, LOG, ESC	RM
23.	Determine Test Support Package requirements (doctrine, training, maintenance, threat, etc.)	PL	EX, ESC, LOG	IC
24.	Determine and make initial coordination for Installation Support	PL	PL, EX, LOG, ESC, PER	IC
25.	Determine lease/contract requirements	PL	EX, RM, IC, LOG	

Figure 4-6 (continued)

	TASK	RESPONSIBLE	COORDINATION	INFORMED
26.	Determine pretest troop training/testing	PL	EX,PER,ESC	SA
27.	Determine aviation support	PL	EX	RM
28.	Determine special communications support	PL	EX, IC	LOG
29.	Use of volunteers (humans as subject of research)	EX	PL, PER	SA
30.	Determine security classification requirements	PL	PL (OPSEC)	EX, IC
31.	Determine contractor support (non-SSL)	PL	EX, IC, PER	
32.	Frequency management	IC	PL, EX	ESC
33.	Process radio freq request	EX	IC	PL
34.	Determine documentary film requirement	PL	EX, IC	
35.	Meteorological data requirements	PL	EX, ESC	

Figure 4-6. (Concluded)

	TASK	RESPONSIBLE	COORDINATION	INFORMED
1.	Develop scenario	PL	EX	SA
2.	Develop threat package	EX	PL	SA
3.	Determine human factors requirements	EX	PL	PER, SA
4.	Determine special safety considerations	PL	EX, PER, IC	ESC
5.	Continue coordination w/proponent	PL		EX, IC, SA
6.	Finalize design matrix and trial conditions	PL	EX, IC, SA	
7.	Identify, develop/procure new instr components/ interface hardware	IC	PL, EX	ESC, SA
8.	Initiate methodology/computer software development	PL	EX, IC	SA, ESC
9.	Complete research on previous work	PL		EX, IC
10.	Analyze (accept/reject) methodology test results	PL	SA, EX, IC	
11.	Formalize terrain request, special waivers	PL	EX, LOG, ESC, IC	
12.	Refine wargame of execution concept	EX, PL	IC	SA
13.	Finalize the request for CDEC player personnel	PL	PER, ESC, IC, HHC	EX, RM

Figure 4-7. TEST DESIGN PHASE

	TASK	RESPONSIBLE	COORDINATION	INFORMED
14.	Finalize the request for CDEC support personnel	PL	LOG, ESC, PER	EX, RM
15.	Request outside player equipment	LOG	PL, PER, ESC, RM	EX
16.	Request outside player and support personnel	PL	PER, ESC, EX, IC	RM
17.	Request outside support equipment	LOG	PL, PER, ESC, IC	EX, RM
18.	Finalize data requirements	PL	EX, IC, SA	
19.	Request ammunition/munitions	LOG	PL, EX	ESC
20.	Initiate request for simulators	LOG	PL, EX	IC, RM, ESC
21.	Finalize budget (cost estimate)	PL	EX, IC, PER, LOG, RM	
22.	Initate request for POL	EX	LOG	PL, ESC
23.	Finalize test schedule (Milestones)	PL	EX, IC, PER, LOG, ESC, RM, SA	
24.	Receive and review test support package	PL	EX, ESC	
25.	Secure installation support	PL	ES, ESC, LOG	PER, RM
26.	Arrange for conduct of pretest troop training/testing	EX	PL, ESC	PER
27.	Finalize test plan	PL	EX, IC, SA	

Figure 4-7. (Concluded)

	TASK	RESPONSIBLE	COORDINATION	INFORMED
1.	Detailed site recon/development	EX	PL, IC, ESC	
2.	Develop PAMRD (Annex to TDP)	EX	IC, PER, LOG ESC	PL
3.	Write and publish DTP	EX	PL, IC	SA
4.	Review DTP		PL, EX, IC, PER, LOG, ESC, RM, SA	
5.	Establish playing area/RMS test	IC, EX	PL,	SA
6.	Conduct instrumentation exploratories	IC	PL, EX, ESC	SA
7.	Conduct DCSEX exploratories	EX	PL, IC, ESC	SA
8.	Conduct record trials	EX	PL, IC, ESC	
9.	Initiate IPR's (as required)	EX	PL, IC, ESC, SA	PER, LOG, RM
10.	Finalize computer software (real time)	IC	PL, EX	SA
11.	Finalize computer software (data reduct/anal)	IC	PL, EX	SA
12.	In-Process outside personnel	ESC	EX, PER, HHC	
13.	Out-Process outside personnel	ESC	EX, PER, HHC, IC	
14.	Monitor quality control of data	EX	PL, IC	SA

Figure 4-8. DETAILED TEST PLAN AND EXECUTION PHASE

TASK	RESPONSIBLE	COORDINATION	INFORMED
15. Maintain trial status charts	EX	IC	PL, SA
16. Maintain equipment status charts	EX	IC, LOG, ESC	
17. Maintain personnel status charts	EX	PER, ESC, IC	
18. Maintain instrumentation status charts	IC	EX	PL
19. Validate trials	EX	PL, IC	SA
20. Return equipment - internal	EX	LOG, ESC	
21. Return equipment - external	LOG	PL, ESC	
22. Restoration of experimentation area	EX	IC, ESC	
23. Release personnel external and internal	ESC	EX, PER, IC	
24. Produce documentary/briefing film	EX	PL, IC	SA
25. Finalize engineer work requirements	EX	LOG, ESC	
26. Establish field site	EX	IC, ESC	
27. Establish ICC	EX	IC, ESC	

Figure 4-8. (Concluded)

	TASK	RESPONSIBLE	COORDINATION	INFORMED
1.	Write and publish test report (TR)	EX	PL, IC, SA	
2.	Review and comment on TR	EX	PL, IC, PER, LOG, ESC, RM, SA	
3.	Develop lessons learned (LL)	EX	PL, IC, PER, LOG, ESC, RM, DA	
4.	Publish military observations (MO)	EX	PL, ESC, IC	SA
5.	Prepare material for data bank	EX	PL, IC	
6.	Annotate PAMRD to reflect actual use	EX	IC, PER, LOG,	
7.	RAM Report - test items	EX	LOG	
8.	RAM Report - instrumentation	IC	EX	
9.	Finalize software documentation	IC	PL, EX	
10.	Distribute TR, LL, MO, etc.	EX		
11.	Finalize budget	RM	PL, EX, IC	
12.	Close TRMS file	RM	PL, EX, IC	
13.	Finalize documentary/briefing film	EX	PL, IC	SA

Figure 4-9. FINAL REPORT PHASE

CHAPTER 5

DETAILED TEST PLAN

5.1 GENERAL. This phase consists of the preparation of the detailed test plan (DTP), verification of the DTP, staffing of the DTP, and presentation of the DTP at a Policy and Review (P&R) Board to obtain command approval. During this phase, specific planning is performed to implement the approved Test Design Plan. The component tasks of this phase and the sequence in which these tasks should be accomplished are depicted in Figure 5-1.

5.2 THE DETAILED TEST PLAN (DTP). The purpose of the DTP is to provide detailed instructions, missions, tasks, organization, and procedures for test execution. Plans for each functional area are prepared in sufficient detail so that individuals are able to determine their responsibilities. Additionally, the test officer must insure that the individual plans are in harmony with each other. The standard format and typical contents for CDEC test plans is presented in Annex 2 to Appendix A. Guidance on development of component plans of the DTP is less specific than in previous planning steps (see Chapter 4, Test Design Plan) since the content and level of detail of the DTP varies widely from test to test.

5.3 REVIEW PROCESS FOR DTP.

a. Internal Review. The purpose of this step is to assure that the component plans are mutually consistent. It is the last step before the DTP is circulated for staff review. This effort can take many different forms. Normal review processes within each DCS may suffice for some tests. Others may require approaches such as exploratory trials and instrumentation tests for the control, collection, and reduction organizations. Observed inconsistencies in the component plans are eliminated prior to circulation of the draft for staff review.

b. Staff Review. The validated DTP is distributed to other DCSs and staff offices for their review and comment. The date on which the draft must be in the hand of

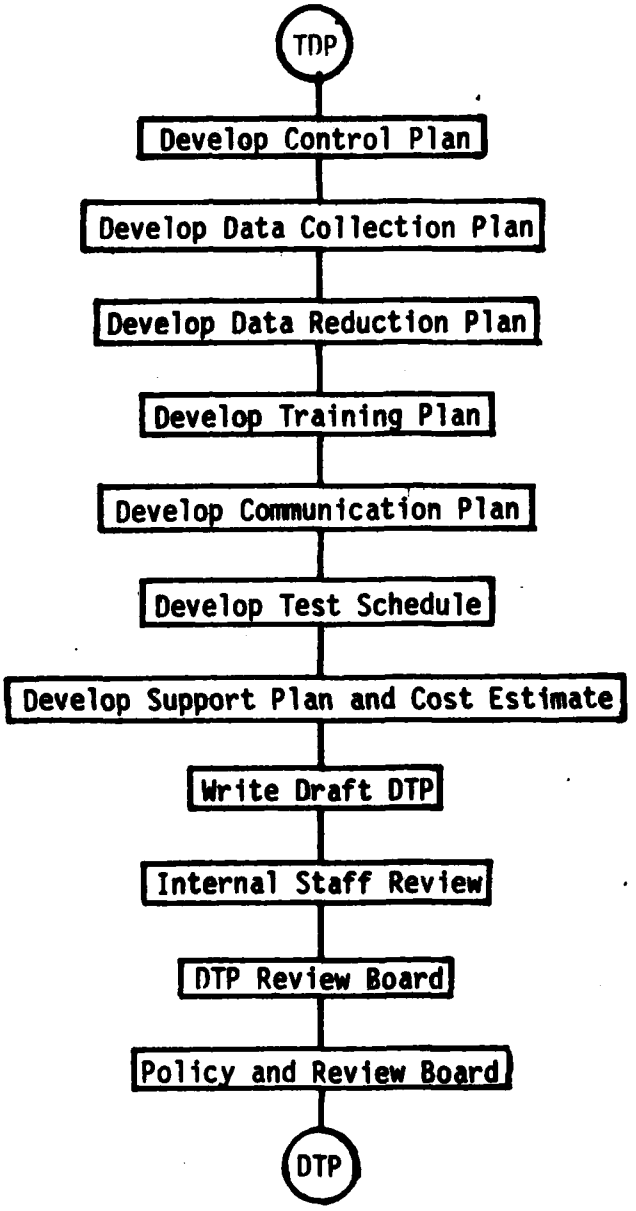


Figure 5-1. TASKING DIAGRAM FOR DETAILED TEST PLANNING PHASE

reviewers is published in the CDEC milestone schedule. At least 10-working days must be allowed for reviewers to prepare and return comments. The test team chief considers each comment, judges its validity, and changes the DTP as appropriate. Each reviewing office is informed if any of its comments are not incorporated into the plan.

c. DTP Review Board. If required (as determined by DCSEX and the test director based on the existence of unresolved issues), a DTP review board is convened at the conclusion of the staff review period to resolve remaining issues in open forum. The review board is chaired by DCSEX and attended by representatives from each staff agency involved in the internal staff review. The review board is not a rehearsal for the Policy and Review Board and does not include a formal presentation of the plan by the test directorate. Each reviewing agency will be prepared to present unresolved issues for open discussion.

d. Policy and Review Board. The P&R Board is a decision briefing at which the Commander approves, approves with changes, or disapproves the DTP. Approval constitutes authority to begin the execution phase. The briefing is a balanced presentation of all the component plans.

(1) Preliminary Arrangements. The test team chief is responsible for delivery of the appropriate number of up-to-date copies of the DTP to the SGS no later than two working days prior to the P&R Board. These copies are reviewed by the Commander and Deputy Commander prior to the briefing. Test officers should coordinate this presentation with DCS, Plans and the Instrumentation Command (Prov). The latter presents assessments of the use, availability, and cost of instrumentation, and ADP support of test goals.

(2) Time Limit. The P&R Board should not require more than one hour. If additional time is required, it should be coordinated in advance with the SGS.

(3) Briefing Format. The test team chief should present a summary of the major points supplemented by clarifying visual aids. Duplication of information presented in the PRB should be minimized. Guidance on particular items is presented below:

(a) Background. This part of the presentation should be a brief summary of the history of the item or concept, the decision problem, and the test substance. It should be much less detailed than the background portion of the TDP, except for changes and further developments occurring in the interim. If additional literature research has been accomplished since the TDP, it should be included in this briefing.

(b) Purposes, Objectives, Scope, and Tactical Concept. These elements are presented as they appear in the OTP.

(c) Individual Plans. The major points of each plan will be presented in sufficient detail so that the commander is able to judge their adequacy and mutual consistency. The exact level of detail will depend on the particulars of each test.

(4) Minutes. The minutes of the P&R Board are recorded and published by a representative of DCSEX. These minutes include a roster of principal attendees, summary of discussion, and a statement of the Commander's orders and decisions.

5.4 DTP PUBLICATION. The DTP is an internal CDEC document and is not formally published for external distribution.

5.5 REFERENCES.

a. CDEC Regulation 700-3.
b. CDEC Regulation 71-2.
c. TRADOC Regulation 71-9.
d. RTCA Handbook, Vol II, Second Edition, 1980.
e. CDEC Supplement to AR 310-2.
f. DA Pamphlet 325-10.
g. CDEC Regulation 385-1, Appendix D.

CHAPTER 6

FIELD EXECUTION

6.1 GENERAL. This chapter addresses those aspects of experimentation that apply to the execution phase of the field experiment. The execution phase of each experiment varies in scope, size, time, and other details. This chapter, therefore, addresses the field execution concept rather than a specific methodology.

6.2 PERSONNEL RESOURCES.

a. Military, Department of the Army civilian, and scientific contractual personnel are employed to accomplish the field execution portion of an experiment. The number of personnel employed to field an experiment is based on a detailed analysis of the tasks to be accomplished and the resources available.

b. The skills of the experimentation personnel range from soldiers performing as experimentation players and data collectors or as safety personnel, security guards, and fire fighters to civilian scientists, technicians, and engineers. Large experiments may employ more than a thousand personnel at the experimentation site. The project team chief is responsible for coordinating the duties of these personnel during the execution of a field experiment.

6.3 DCS, EXPERIMENTATION ORGANIZATION.

a. Deputy Chief of Staff, Experimentation (DCSEX) is the CDEC element responsible for operational direction of an experiment to include experimentation reporting. This element is organized as shown in Figure 6-1 and consists of the Administration, Resources, Reports and Experimentation Divisions, and four Project Teams that actually plan, execute and report on field experimentation. The DCSEX staff provides assistance to the project teams in specific areas of the planning, execution and reporting phases.

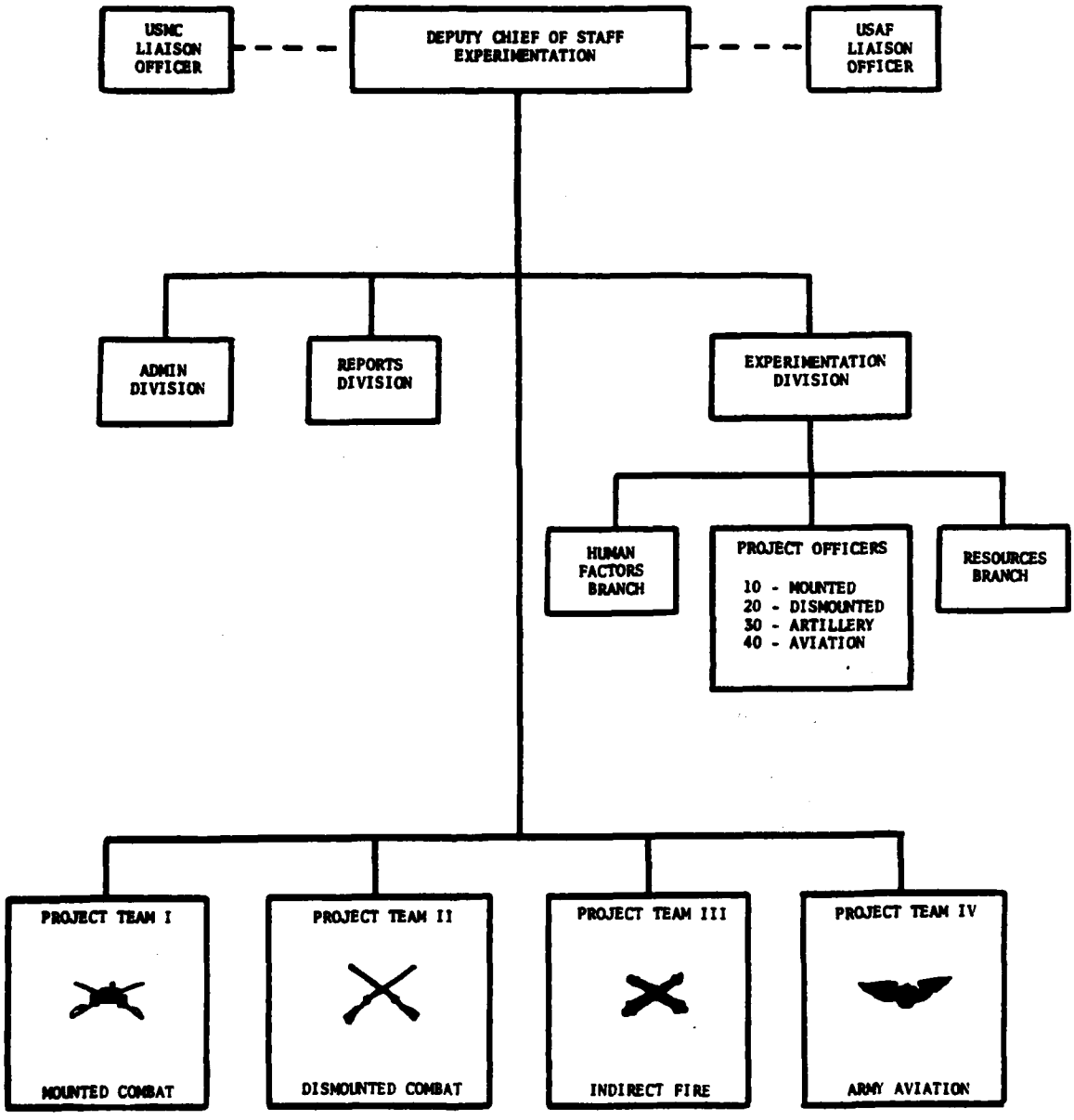


Figure 6-1. DCS, EXPERIMENTATION ORGANIZATION

b. The Reports Division provides editorial support and coordinates graphics and typographic assistance in the preparation of test plans, test reports, and military observations.

c. The Experimentation Division contains three elements:

(1) The project officers are responsible for coordination with the project teams, other CDEC elements, outside organizations such as CACDA, TRADOC, and the experiment proponent.

(2) The Human Factors Branch provides technical advice concerning the role of behavioral, biological and medical variables in field experimentation. Its activities involve efforts to control extraneous human variables such as player selection, motivation, etc., as well as deliberate manipulation and measurement of human performance variables which are relevant to the experimentation objectives.

(3) The Resources Branch requests and coordinates personnel, equipment, and facilities required by the project team to conduct an experiment.

d. The four project teams compose the focal point for field experimentation. As shown in Figure 6-1, each project team has a special field or area of expertise as specified in CDEC Command Policy 71-3. Ideally, Project Team I will conduct primarily mounted experiments, Project Team II dismounted experiments, Project Team III indirect fire or artillery experiments, and Project Team IV will handle aviation type experiments. In practice, each team must be prepared to execute tests of all types. Several different combat elements often are tested in the same experiment. Another consideration is resource allocation: i.e., the need to distribute the available experimentation work load among the teams in a roughly equal manner. Experimentation in the areas of combat support and combat service support may be undertaken by any team specified by the DCSEX. Teams not in the execution phase usually are in the planning or reporting phases of experiments, about to go to, or have just left the field.

e. Each project team includes a small nucleus which must be augmented to perform experimentation planning, execution, and reporting. The larger and more

extensive the experiment, the greater the number of additional officers and scientific support personnel that must be provided to the team to assure smooth and successful field execution.

f. US Marine Corps and US Air Force Liaison Officers are located at DCSEX to maintain liaison between USMC Developments and Education Command, USAF Tactical Air Command, and CDEC when development activities are of common interest.

6.4 TASK ORGANIZING.

a. Generally speaking, the CDEC organizational structure facilitates the task organization approach of applying mission oriented resources to field execution. This method places task groups or elements under the control of the project team for the purpose of executing experiments. Experimentation Support Command (ESC) elements operate under the control of a project team during the designated daily experimentation period. The Scientific Support Laboratory (SSL) provides skilled task groups under a project manager to the military project team. Each team is tailored to the assigned experiment in order for CDEC to properly address its mission requirements with assigned resources.

b. After an experiment has progressed through the planning processes and all resources are identified, directives are issued to the Instrumentation Command (Prov) and the Experimentation Support Command (ESC) to furnish player and control resources for the experiment task organization. Figure 6-2 portrays a typical team organized to conduct an experiment.

c. The size of elements that come under the team's control is dependent on the magnitude of the experiment. The functional elements provided by ESC and Inst Cmd (Prov) enable the project team to create, install, control, and maintain the experimentation environment. The ESC also provides the engineer, Personnel Administration Center (PAC), transportation, and maintenance support vital to each experiment. This support varies according to mission requirements and facilities already available at the chosen experimentation site. The installation and operation of instrumentation at the experimentation site is essential to the success of the experiment.

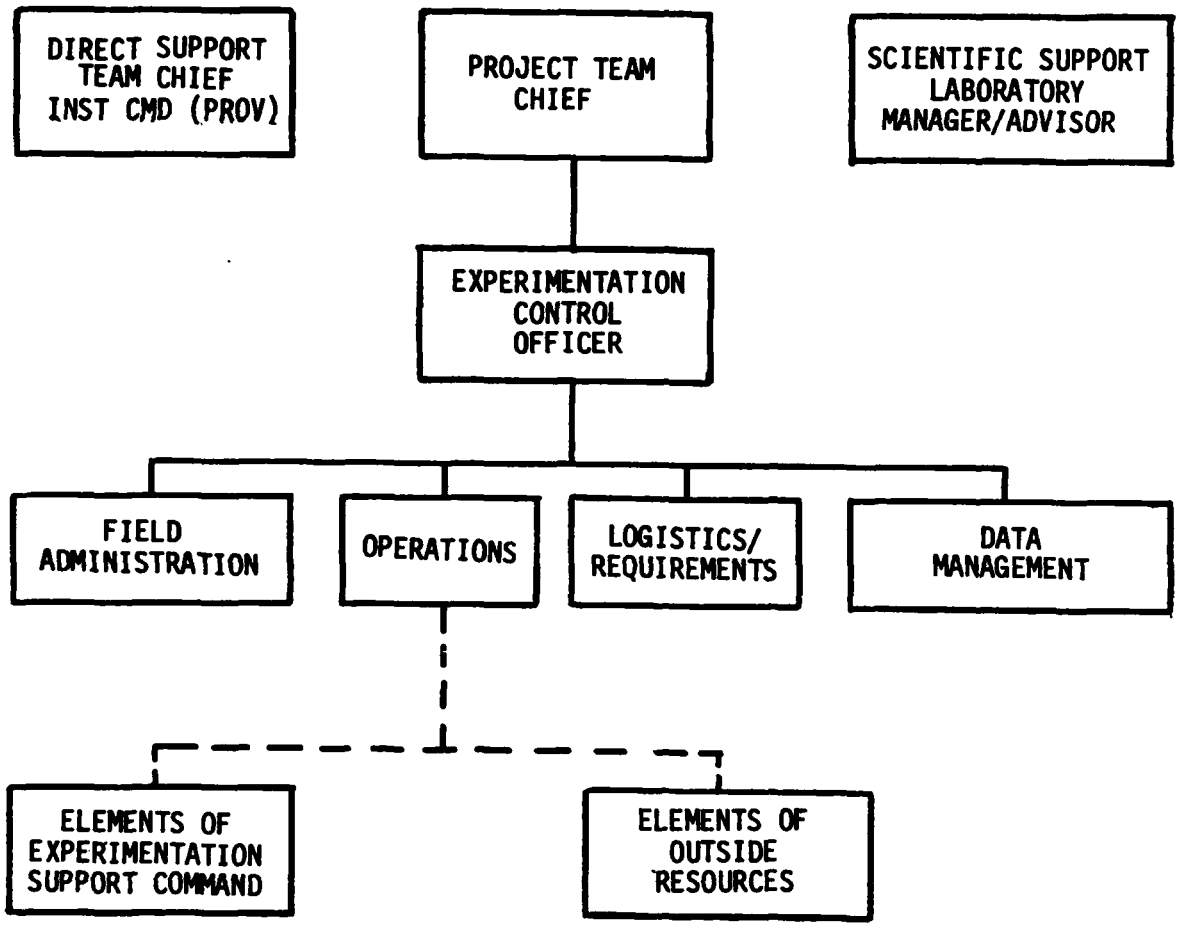


Figure 6-2. TYPICAL PROJECT TEAM IN THE FIELD

d. Most experiment players come from the ESC or FORSCOM. Types and numbers of players vary with each experiment and are dependent on the scenarios developed in the planning phase of the experimentation process.

6.5 **CONDUCT OF FIELD EXECUTION.** Approval of the DTP marks the end of the formal planning process and entry into the field execution phase. This is the phase in which the test events are conducted and the required data is collected. The steps involved in test execution are pretest activities, exploratory trials, adjustment of the plan, and the actual test. The sequence of these steps is shown in Figure 6-3.

6.6 **PRETEST ACTIVITIES.** These activities involve all pretest training, organizing for execution and support, development of new instrumentation and computer software, and test and area preparation. The training plan and the support plan are of major interest during these activities.

6.7 **EXPLORATORY TRIALS.** Exploratory trials are conducted for all CDEC tests. Exploratory trials include the exercise of every type required event in the DTP as well as every type of data collection instrument planned for use in the test. The purpose of exploratory trials is to exercise the test control organization and instrumentation systems and to detect any deficiencies in planning, training, or coordination not revealed during verification or staff review. Exploratory trials are of shorter duration than the actual test; however, it is essential that all players, controllers, data collectors, data reducers, and support personnel participate. The degree of player participation is tempered by considering whether learning during the exploratory trials would bias the results of the actual test. Data is collected and reduced in the same manner and by the same personnel as used for the actual test. Plans for exploratory trials are incorporated into the control plan, the support plan, and the test schedule. For tests employing new instrumentation or new instrumentation concepts, it is advisable to conduct systems validation tests of this equipment prior to fielding large numbers of personnel. Results of the exploratory trials are presented at an IPR. Exploratory trials are scheduled to allow sufficient reaction time for necessary modifications and adjustments prior to the actual conduct of the test. Exploratory trials are conducted under the strict control of the test team chief. To minimize interference with the objectives of the exploratory trial, visitors will be controlled by the test directorate, with assistance as necessary from Protocol.

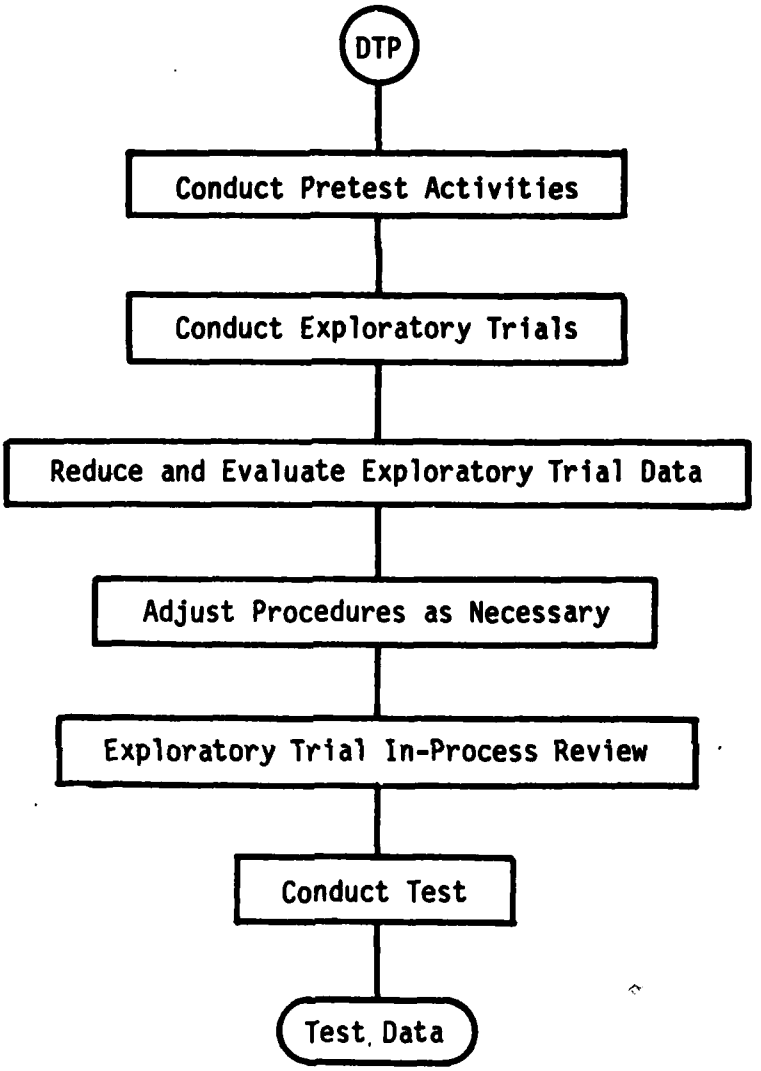


Figure 6-3. TASK DIAGRAM FOR TEST EXECUTION PHASE

6.8 ADJUSTMENT OF THE PLAN.

a. During this step, deficiencies exposed during exploratory trials are corrected. This may involve conducting additional training, adjusting instrumentation, software, or methodology, requesting additional support, or altering the plan. Proposed changes to the plan should receive an analytical review by the ORSA officers and SSL analysts of the test team and DCS, Plans to see how the changes affect the analysis of objectives.

b. Significant changes require approval from the Commander, CDEC before test excecution. The exploratory test IPR is the forum for presenting proposed changes and seeking approval. The test team chief must insure that the principal agencies affected by the change (proponent and supporting agencies and or units) concur with the proposed changes or have the opportunity to present reasons for nonconcurrence to the Commander, CDEC.

6.9 CONDUCT OF THE TEST.

a. Actual test execution does not commence prior to receipt of TDP approval from HQ TRADOC or the specified TDP approval authority.

b. When the test begins, the test team chief is responsible to see that the approved plan is followed. This requires substantial supervision and control of all resources dedicated to the test. He insures that the prescribed scenario is followed, that support activities are functioning, and that data is collected and stored properly. Security of data and equipment is a major concern. Equipment left overnight must be protected from damage by the elements and from theft or vandalism. The test team chief also oversees the safety plan and insures its implementation.

c. The data management officer has the responsibility for overseeing the identification, collation, reduction, and storage of all the experiment data. Quality control to assure proper execution of all data collection and reduction steps is essential. A formal informational feedback loop should exist between Data Quality Control and Field Operations so that procedural and instrumentation problems discerned by the quality

control analysts during their quick look examination of the incoming data can receive prompt attention. It is desirable that samples of the collected data undergo the full data reduction process while the field execution phase is still underway, so that errors in the data collection and reduction plans can be discovered while the possibility of correcting field procedures still exists. As will be discussed in Chapter 7, the time available for data reduction between the end of the field execution phase and the date on which the test report is scheduled to be published is limited. Any data reduction and analyses which can be performed during the field execution phase will leave more time during the crowded reporting phase for the actual writing of the test report.

d. During the test, it may become apparent that deviation from one or more of the plans is required. The test team chief will consult with the analysts supporting the test (DCSEX and DCSPLANS) prior to making changes to insure that the change will not bias or invalidate the test results. Any such deviation from the test plan will be immediately and fully documented for later reference.

6.10 REFERENCES.

a. MIL-STD-847A.

b. AR 71-3, "User Testing", Department of the Army, 8 March 1977.

c. TRADOC Reg 71-9, "Force Development, User Testing and Evaluation", May 1981.

d. CDEC Command Policy 71-3.

CHAPTER 7
REPORTS AND FILES

SECTION I: TEST REPORTING

7.1 GENERAL. This chapter establishes procedures, defines responsibilities, and provides guidance for writing and publishing reports of tests conducted by CDEC. The reporting phase of an experiment covers the period from the completion of the last record field trial until the publication of the test report. In actual practice, preparatory work on the test report usually is initiated while the field execution phase is still underway.

7.2 TYPES OF REPORTS.

a. Test Report. This document which contains the data obtained from executing the test and describes the conditions that prevailed during test execution and data collection and, as required, analyses of test results versus test objectives. (Ref. Annex M to TRADOC Reg 71-9.) The format for CDEC test reports is presented in Annex 3 to Appendix A.

b. Letter Report. The letter report is an abbreviated report which does not follow standard report format. It is used only when authorized by Headquarters, TRADOC. The letter report is prepared in the form of a military letter. Its contents are determined by the nature of the test being reported. The letter report is intended for use when it is not practicable to array test data in the standard report format. (Ref. Annex N to TRADOC Reg 71-9.) A format for CDEC letter reports is presented in Annex 3 to Appendix A.

c. Data Package. The data package normally presents ordered (Level 3) and/or descriptive (Level 4) data along with those descriptions that are necessary to explain the format in which the data are presented. If the volume of data to be presented is relatively small, the data package may be included as an annex of the test report; if the volume of data is great, it will be presented in a separate volume. Format of the data package is determined on a case-by-case basis. The proponent may, as a supplement or as

a partial substitution for the data package, request that experiment data in the form of computer tapes, cards, or listings, be forwarded to them or to an independent agency for further analysis. These requests are handled by DCS, Experimentation on a case-by-case basis. Data requests received after the publication of the test report usually are processed by the DCS, Plans, Data Bank.

d. CDEC Military Observations. Important information based on nonquantifiable observations of events is often generated during testing. These observations are published in a report entirely separate from the test report which emphasizes topics concerning training, tactics, doctrine, materiel, and other matters of military significance arising from the test. This document is prepared under the direction of the DCSEX with input from all major staff elements. Military observations treat the subject matter so that non-scientific and non-military readers can understand it. Inconsistencies in the quantified results of the test report will not be explained or rationalized in this document. This report is presented for the Commander's signature within 45 duty days of the completion of record trials of an test. The DCSEX recommends special distribution and dispatches this document to those parties approved by the Commander. Routine distribution is made to holders of CDEC document "A Compilation of USACDEC Military Observations" per a standard distribution list maintained by the DCS, Experimentation Reports Division. The format for CDEC military observations is presented in Annex 10 to Appendix A.

e. Test Critique. Within 20 duty days following completion of record trials of a test, DCSEX submits a critique of test activities in accordance with applicable CDEC policy. This critique is distributed to appropriate staff sections within CDEC for information and comment. The format for test critiques is presented in Annex 9 to Appendix A. The primary intent of the critique is to enhance the efficiency of field testing, particularly at the project team level. Criticism should be constructive in nature, with the goal of rectifying deficiencies and recommending improvements in the test process.

f. Interim Reports. In some instances, CDEC may be required to provide emerging data while tests or the analysis are being conducted. The format of interim

reports are decided on a case-by-case basis. In some cases, a letter report format is adequate. Where there is considerable information to be presented, a format similar to the final report format may be appropriate. If an agency requires some indication of the results of a test before a final report has been fully reviewed and/or approved by the P&R Board, copies of the draft report may be sent to that agency upon approval of the Commander. Known changes accompany the report. It may state that the results are not final, have not been completely reviewed, etc., as applicable.

g. Other Requests. From time to time, CDEC has produced other test related reports for external distribution. Reference 7.10.d is an example of a final report on a follow-on analysis of experimentation data. In this case, CDEC was tasked to perform a follow-on analysis of an experiment's data, the results of which were not to be available until well after the standard test report of experimentation was needed. Most large scale experiments produce additional documents relating to instrumentation, methodology, and software design, and for RTCA experiments on input data employed. These documents are usually for CDEC-internal distribution.

7.3 TEST REPORT FORMAT AND CONTENT. See Annex 3 to Appendix A.

7.4 DOCUMENT DEVELOPMENT.

a. General. The varying circumstances within the CDEC test program make it impossible to set a definitive schedule for the development and production of all CDEC test documents. This paragraph attempts to set general guidelines and to show the basic developmental steps in an ideal situation.

b. Planning. It is important for the project team to coordinate planning with DCSEX Reports Division at the earliest practicable point in the development cycle. Reports Division provides estimates of the word processing time required, considering other documentation work in progress. Reports Division can offer guidance in meeting differing circumstances and needs. No two test documents present identical problems.

c. Scientific Support Laboratory (SSL). Usually the SSL is responsible for the development of portions of any test document and may be responsible for the major portion of certain documents. The Editorial Section of the SSL works closely with Chief, Reports Division who has the ultimate responsibility for document production.

d. Writing the Report. Portions of the test report such as introductory passages, background information, and objectives may be written prior to test completion. Sections of an experiment's TDP or DTP may with a limited amount of adaptation and updating serve as much of the introductory material to the test report. Report results are not written until the analysis of all test data is complete. The key to successful reporting of results is to analyze all test data thoroughly and then follow a logical process of interpreting test results. When writing the initial draft, the author should concentrate on making the flow of evaluation from raw data to findings as natural and clear to the reader as possible and clearly explain mathematical and statistical processes used.

e. Preliminary Drafts.

(1) Text. The preliminary drafts of any document should be typed within the author's unit (e.g., project team) and appropriately reviewed prior to submission for word processing (magnetic media). The format should conform to the style presented in Annex A of this guide except that it should be in double space (draft) form.

(2) Graphics. Preliminary graphics (drawings, bar graphs, charts, maps) should be rendered accurately in pencil and delivered to the Reports Division Graphics Section as early in the development cycle as possible. Copies of original rough art may be made for retention with the text. Personal contact between the author and Reports Division illustrators is strongly encouraged to assure that the author's intentions are fully and accurately understood.

f. First Smooth Draft.

(1) Magnetic Media. After appropriate review, the double spaced preliminary draft is delivered to Reports Division for typing on word processor. Only complete

sections of the document should be delivered; i.e., whole chapters or appendixes. At this time, Reports Division should be provided with an outline of the document showing a rough estimate of the number of pages and a list of significant milestone dates, to include (as appropriate) staffing schedule, "murder board," P&R Board, and distribution deadline. By the time the text is completely programmed, all graphics should be ready for assimilation into the document.

(2) Informal Staffing. Reports Division provides copies for informal staffing as required. All masters (text and graphics) are retained by Reports Division. Informal staffing is an internal review by project team and SSL personnel and may include a "murder board." Distribution addressees and the schedule for informal staffing are internal matters of the project team.

g. Final Draft.

(1) Corrections and Revisions. At the completion of informal staffing, the project team returns a complete, marked-up copy of the document to Reports Division for corrections/revisions. Corrections and revisions should be indicated using the editorial marks described in Figure 7-1.

(2) Preparation for Formal Staffing. Reports Division makes all corrections and revisions as required and arranges, through DCSPER, Admin Services Branch for the reproduction of sufficient copies of the document for formal staffing.

(3) Formal Staffing. Reports Division, in coordination with the project team, will prepare a staffing DF for DCSEX signature. An example staffing DF is given as Figure 7-2. Reports Division distributes copies of the draft document for staffing.

(4) Commander's Approval. Prior to the Test Report P&R Board, Reports Division prepares an approval letter for the Commander's signature. This letter usually is presented to the Commander for signature at the close of the P&R Board. (The approval letter is reproduced on the reverse of the front cover of the document.)

SIGN	MEANING	EXAMPLE
≡	Capitalize letter or word	...in the pacific area. Typhoon Ruth was...
/	Change to lower case	...approached the High ground.
(ltr)	Change (correct) letter	...at Ford Ord, California
ℓ	Delete letter or word	...near the the target range.
⁀	Close up; delete space	TOW mi sile
#	Insert space	TOWmissile
¶	Begin new paragraph	...the experiment. The problem of...
⁀	Run paragraphs together	...resulting to lower casualties. Upon further consideration...
⌐¬	Transpose adjacent words	...numbers two, one, and three.
⇄	Transpose order of words	alpha, bravo, delta, and charlie.
⤵	Transpose letters	Monterey, Calfiornia
o	Change mark to a period	...in the interim. COL White suggested...
⌄	Insert apostrophe	MAJ Browns DF concerning...
^ ^	Insert comma or period	However the primary reason for...
STET	"Let it stand" (used to rectify erroneous deletions)	...tanks, ~~missiles~~, and aircraft. STET
sp.	Spell out	...at CDEC, Fort Ord, California
[	Move left	a. Beans b. Bullets c. Butter
]	Move right	1. Clouds 2. Weather 3. Pressure
	Change word	...are suggestive indicative of the...
Insert ②	Add new sentence or paragraph	(Write additions legibly on a separate sheet, assign a number, and indicate the exact place of insertion on manuscript with a numbered arrow.)

Figure 7-1. EDITORIAL MARKS

DISPOSITION FORM

For use of this form, see AR 340-15, the proponent agency is TAGCEN.

REFERENCE OR OFFICE SYMBOL	SUBJECT
ATEC-EX-D	MMGR Test Report (Draft)

TO SEE DISTRIBUTION FROM DCS, Experimentation DATE 30 Jan 1980 CMT 1
Mr. Richards/dt/2662

1. Inclosure 1, a draft copy of the MMGR Test Report, is forwarded for your information and review. This document was informally staffed and all corrections/revisions have been incorporated. A P&R Board for this document is scheduled for 1300 on 13 February.

2. Addressees should retain Inclosure 1 and forward comments/recommendations separately to Chief, Proj Tm 1 (ATTN: MAJ Martinez, 5516/2005) NLT COB 8 Feb 80.

3. Distribution of this draft report outside CDEC is unauthorized unless approved by the Commander.

1 Incl
as

R. K. PFABE
Colonel, GS
DCS, Experimentation

DISTRIBUTION:
1 - CDR (Info only)
1 - DCDR (Info only)
1 - CofS (Info only)
1 - SA (Info only)
2 - DCS, Plans
1 - DCSEX
  2 - C, Proj Tm I
  1 - C, Ex Div
  1 - C, Human Factors Br
1 - DCSRM
1 - DCSLOG
1 - DCSPER
1 - CDEC SSL
1 - Cdr, ESC (ATTN: S3)
2 - Inst Cmd (Prov)

DA FORM 1 FEB 62 2496 REPLACES DD FORM 96, WHICH IS OBSOLETE. ☆GPO—1979—665-422/1063

Figure 7-2. SAMPLE DF FOR STAFFING CDEC TEST REPORTS

h. Combined Staffing.

Occassionally, time constraints preclude conducting both informal and formal staffing. In such a case, Reports Division prepares the document for combined staffing of the first smooth draft, and makes the distribution.

i. Final Product.

Production and Distribution. Reports Division makes all final corrections/revisions in accordance with P&R Board decisions. They then prepare the printing instructions, complete a DD Form 844, "Requisition for Local Duplicating Service," and forward the print masters to the DCSPER, Admin Services Branch. When the document has been printed, Reports Division distributes it in accordance with the approved distribution list.

7.5 RESPONSIBILITIES.

a. General. The DCSEX is responsible for writing, publishing, and distributing all test reports. DCSEX also insures the technical accuracy of documentary films produced by Commander, Instrumentation Command (Prov) who is responsible for the cinematic form of the films. The writing requirements for discrete sections of the report are assigned to project team members by the project team chief. The Scientific Support Laboratory (SSL) produces the scientific portions of the report such as data summaries and analyses as directed by the team chief. Final test reports must be completed and mailed to addressees within 60 days following completion of field execution. If sufficient justification exists, exceptions to this policy may be requested, in writing, from the Chief of Staff.

b. Reports Division. The Reports Division provides assistance to the project team in the preparation of test reports and is responsible for preparing the document for printing. Specific responsibilities of the Reports Division include:

(1) Providing input to the project team's reporting schedules, i.e., required lead times for typing, graphics preparation, and printing.

(2) Assuring proper format and consistency through coordination with the project team chief and project team writers.

(3) Providing editorial expertise regarding style, grammar, and graphics production.

(4) Assuring proper marking of classified material (in coordination with the CDEC Security Officer).

(5) Coordinating all word processing support including initial typing through revisions and final typing on magnetic media (disc), control of all print masters, and maintenance of word processing disc files generated by the division.

(6) Coordinating with SSL Editorial Section regarding parts of the report produced by SSL and incorporation of SSL sections into the report.

(7) Coordinating with the Training and Audio Visual Support Center (TASC) for graphics assistance beyond the scope of Reports Division illustrators.

c. Project Team.

(1) The project team coordinates plans, milestones, and deadlines with Reports Division and provides an outline of the report.

(2) Writing tasks concerning specific topics will be assigned by the project team chief to military and scientific members of the team who are responsible for the content of the material. Before and during the test, writing proceeds on topics which do not rely on the final results of the test.

(3) Draft (double-spaced typed) text is delivered to Reports Division as early as practicable in the reporting cycle for typing on magnetic disc.

(4) Clear rough graphics (charts, maps, graphs) are forwarded as early as practicable to Reports Division for preparation in final form.

(5) Upon completion of the test, the military and scientific members of the project team commence preparation of the sections of the report which present the results of the test. Scientific data analyses are normally in progress at this time. The determination of final results and recommendations must await completion of these analyses.

SECTION II: TEST FILES

7.6 AUTHORITY. To establish a complete record of each CDEC test, CDEC test files are maintained in accordance with instructions in AR 340-18-2.

7.7 PROJECT CASE FILES.

a. The DCSEX maintains project case files which include copies of all correspondence and information (e.g., terrain requests, task assignments, test design plans) relating to each test. These files are to be maintained in the Experimentation Division, DCSEX, for at least two years following the publication of the test report. In January and July of each year thereafter, the files are reviewed by the DCSEX and a list of dormant files submitted to all staff elements requesting comments on their final disposition. As determined from these comments, files more than two years old may be:

(1) Retained as an active file if so requested by any staff element.

(2) Retired as a permanent file in accordance with appropriate regulations.

(3) Destroyed in accordance with appropriate regulations if no longer required.

b. A record of the final disposition of each file removed from the active system is maintained as an integral part of the filing system. This record includes whether the case file is active or has been removed from the system and, if removed, its disposition (retired or destroyed) and the date of its removal.

c. Classified project case files are treated in accordance with appropriate regulations.

7.8 **LIBRARY REFERENCE FILES.** The CDEC Technical Information Center receives two copies of test design plans, detailed test plans, test reports, military observations, and data packages for reference purposes. All distribution lists will include the CDEC Technical Information Center.

7.9 **DATA STORAGE.** Unless otherwise directed by the Commander, all data generated by CDEC experimentation, to include a copy of the final report and all computer programs (except instrumentation programs, magnetic tapes and punched cards), are submitted to the Data Management Officer (Methodology Division) of DCS, Plans for inclusion in the data bank IAW CDEC Reg 18-1. The DCS, Plans is responsible for insuring that the data are processed for storage in accordance with the data storage and retrieval annex of the detailed test plan. All data and programs submitted for retention in the data bank must be complete and fully documented. Requirements and procedures for data bank storage of an experiment's data are presented in Appendix C.

7.10 **REFERENCES.**

a. CDEC Test Report, "Tactical Effectiveness Testing of Antitank Missile Systems - Experiment 11.8 (TETAM), Volume V, Data Package Phase 1A, B, and C", March 1973.

b. CDEC Test Report, "Tactical Effectiveness Testing of Antitank Missile System - Experiment 11.8 (TETAM), Volume IX, Data Package, Phase III", April 1974.

c. CDEC "A Compilation of USACDEC Military Observations", January 1979.

d. CDEC Report, "CDEC Suppression Experimentation Data Analyses Report", April 1976.

e. AR 340-18 series, The Army Functional Files System.

APPENDIX A

FORMATS FOR TEST DOCUMENTS (PLANS AND REPORTS)

1. GENERAL.

a. All plans and reports published by CDEC should reflect favorably on the command, not only with regard to the document's content but, also, its neatness, presentability, and readability. The development of a document and, ultimately, its usefulness to the reader are enhanced by the use of standardized formats. CDEC's standarized formats confer the additional benefit of providing a "CDEC-look" to documents that receive external distribution. These standarized formats are presented in the annexes to this appendix.

b. A general comment can be made about writing with a standarized format. An inexperienced report writer sometimes is tempted to adjust the report content to fit the required format. This is done by using "boiler plate" to pad out an unneeessary paragraph specified by the standard format, or by truncating or omitting useful information which does not fit the format. Standarized formats, such as those listed in this appendix are designed to enhance the communications link between the writer and the reader. While the formats should be adhered to as much as possible, they should not be followed to the point of diminishing the content or the clarity of a report.

2. FORMATS FOR OTHER CDEC DOCUMENTS. The format used for this manual is frequently used by TRADOC agencies for manuals, concept documents, and publications other than test plans and test reports. It is a simple, straightforward format and is recommended for use in documents where no particular format is specified.

3. LIST OF ANNEXES.

Annex 1 - Outline Test Plan Preparation

Tab A - Format for the Outline Test Plan

Annex 2 - Typical Contents and Format for CDEC Test Design Plans and Detailed Test Plans

Annex 3 - Typical Contents and Format for CDEC Test Reports

Annex 4 - Paragraphing Style for Chapters of CDEC Test Plans and Test Reports

Annex 5 - Paragraphing Style for Appendixes, Annexes, and Tabs in CDEC Test Plans and Reports

Annex 6 - Guidelines to Tables, Figures, and Equations

Annex 7 - Covers and Front Matter for CDEC Test Reports

Annex 8 - Distribution of CDEC Test Documents

4. **REFERENCES**

a. TRADOC Pamplet 71-3.

b. CDEC Interim Style Guide, July 1978.

c. AR 70-4 (Appendix 4).

ANNEX 1 TO APPENDIX A

OUTLINE TEST PLAN PREPARATION

1. **PURPOSE.** The purpose of this annex is to provide administrative and editorial information for the preparation of an outline test plan (OTP).

2. **GENERAL.** The OTP will be developed at the earliest possible date for all systems. Where approved for inclusion in the Five Year Test Program (FYTP), the OTP becomes a formal resource tasking document (for the current and subsequent budget year) and approved input to the system Coordinated Test Program (CTP).

3. **EDITORIAL CONSIDERATIONS.**

a. Use 8½" x 11" white paper.

b. Use one side of page only.

c. Make all pages read from top to bottom (do not turn page sideways).

d. Use 1" margin on all four sides of page.

e. Single space within paragraphs, double space between paragraphs.

f. All numbers will be expressed in figures rather than spelled out.

g. All abbreviations will conform to AR 310-50, title: "Authorized Abbreviations and Brevity Codes."

h. All acronyms will be spelled out at first usage in the OTP; thereafter only the acronym will be used throughout remainder of the OTP.

i. All OTP's must be dated. The date must be changed every time the OTP is revised. The cost estimate page must also be dated and changed as revised. The date space on the cost estimate page (labeled OTP date) must match the date on the cover of the OTP.

j. OTP should use the metric system throughout. Metric system may be used in conjuction with the customary system. Examples are as follows:

(1) A range 1 mile (1.6 kilometers) wide.
(2) The vehicle burns 1 gal (3.7 liters) per hour.
(3) Each round weighs 1 lb (.45 kilograms).

k. OTP normally should not exceed 12 pages in length.

(1) All OTP's submitted to OTEA must have an even number of pages. This may necessitate the addition of a blank page.

(2) All blank pages in an OTP will be numbered, labeled "Blank Page," and have a security classification at the top and bottom of the page.

4. **OT NUMBERS.** OT numbers will be obtained from OTEA (CSTE-POP) for each new OT. Upper case letters immediately after the OT number (OT 25A) will be used to indicate phased tests. Lower case letters immediately after the type test (OT 1a) will be used to indicate a test that is being rerun.

5. **SUBMISSION SCHEDULE.**

a. The exact suspense date for submission of new/revised OTP's will be announced by message prior to each TRADOC TSARC. Late February and early September are good planning dates.

b. Single "page-holder" OTP's are acceptable for the out years, but complete OTP are required for the current and budget years for funding purposes. If a test is to be

completed but still has milestone events to be completed prior to publication of next FYTP, a one-page milestone holder OTP will be inserted in place of the complete OTP. If a test and all its milestone events are to be completed prior to publication of the next FYTP, the OTP will be withdrawn.

6. **REVISIONS.** The publication of a draft FYTP (Blue) in March and September is to alert the testing community to changes in OTP requirements. Changes fall into one of the following three categories:

- Major (substantial) - example: Change of test date/location, or a significant change in resource requirements.
- Minor - example: Format changes (old and new information such as POL or change of instrumentation.
- Less significant - example: Heading Title changes.

a. Major Changes. Whenever a major change is made to an OTP, the change will be highlighted in the left margin of the page(s) submitted for printing in the draft FYTP. This highlighting will be done only on the copy, however, never on the original which will be used in the printing of the DA approved FYTP.

b. Minor Changes. Minor changes are of interest to some commands/agencies. This is particularly true for tests to be conducted in the current and in budget years. For example, deletion of two test directorate members and addition of two others would not be considered a major change since it would not change the overall test size, but would be of interest to TRADOC and/or FORSCOM. If such minor changes are not highlighted, other agencies will not see such changes until distribution of the DA approved FYTP.

c. Less Significant Changes. It is agreed that less significant changes will not be highlighted but will be covered through normal coordination with the agencies having an interest in the specific OTP.

7. **OTP FORMAT.** Tab A to this annex presents the detailed format for an OTP. This format is in accordance with Appendix C of AR 71-3 which specifies the appropriate OTP format, and with minutes of past TSARC Working Group meetings.

TAB A TO ANNEX 1 TO APPENDIX A

FORMAT FOR OUTLINE TEST PLANS

Date: _____

TEST TITLE: (Title of test or tested system, short title and OTEA test number.)

TEST TYPE: (e.g., Operational Test I (OT I). Indicate if combined DT/OT.)

COMMAND/AGENCY HAVING OT RESPONSIBILITY: (Proponent/Command or Agency with functional responsibility for operational test: e.g., OTEA for major and selected nonmajor systems, TRADOC or as assigned for other nonmajor systems. Indicate major, Category 1, 2, 3, or 4, as appropriate.) The parentheses indicate school/command/agency which is the proponent for this test; e.g., USAFAS, USAES.

TEST INSTALLATION: (Installation responsible for providing administration, logistical, and military personnel support for operational testing.)

TEST ORGANIZATION: (Command or agency conducting test.)

TEST UNIT: (TOE unit or individuals for operational testing. If specific unit is unknown, indicate type unit preferred.)

DA STAFF PROPONENT: (Staff Agency with primary staff interest.)

TEST LOCATION: (Where test will be conducted.)

TEST DATES: (Actual test dates by day, if known, month, CY (begin/end) and T-date.) (T-date: The day the test starts (the point where data are collected for record) or when pretest player training is started, provided training is conducted at the OT test site and training is listed as an objective of the test.)

1. **REFERENCES.** (For example, requirements, test documentation, previous tests, authority. Do not cite DOD directives or Army regulations.)

2. **PURPOSE.** (State why test is required. Describe what will be done with test results.)

3. **OBJECTIVES.** (Broad objectives derived from critical and operational issues.)

a. Objective 1. (For example: Provide information/estimate/obtain data concerning...)

b. Objective 2. (Follow format of a. above. Enter as many objectives as required.)

4. **SCOPE AND TACTICAL CONTEXT.**

a. Scope. (Qualitative or quantitative summary of test size, comparisons to be made, type of measures to be taken, and characteristics of methodology.)

b. Tactical Context. (Friendly and threat forces, tactical concept, types of events, nature of terrain and environment, and main thrust of scenario.)

c. Environmental and Energy Impacts. (Include statement: "The environmental and energy impacts of this test (are) (are not) considered to be significant". If applicable, the environmental and energy impact of the system during test will be addressed in the test report.)

NOTE: Paragraph 4 should, in total, be no more than 1½ pages long.

5. **TEST RESOURCE REQUIREMENTS.** (Estimate of resource requirements at time of preparation. A positive entry is required: the term "To Be Determined (TBD)" is not acceptable.)

a. Test Directorate. (Describe resources to establish and operate the test directorate. Include all directorate personnel.)

(1) Personnel Requirements.

(LINE #)[1]	POSITION	GRADE	MOS	QTY	INCL DATES (Use T-Dates)	SOURCE

(2) Equipment Requirements. (List equipment required for command and control of test: e.g., vehicles, radios, other field/special equipment.)

TYPE	QTY	INCL DATES (Use T-Dates)	SOURCE

b. Player Participants.[2]

(1) Personnel Requirements. (Describe resources for players to include friendly, aggressor, and support forces.)

UNIT/ELEMENT[3]	STRENGTH	INCL DATES (Use T-Dates)	SOURCE

(2) Training Implications. (Indicate the training benefits participants will receive from both the pretest troop training (h(2) below) and their participation in the actual conduct of the test. Indicate enhancement of unit training and readiness due to participation in test. Any negative features should also be recognized.)

(3) Human Volunteers. (Include statement that Human Volunteers will or will not be used in test (AR 70-25).)

---

1. Optional.
2. If player equipment is required, it will be listed as para. 5b(2) using the same format as para. 5a(2).
3. If individual player participants are required, use format shown at para. 5a(1).

c. Test Facilities/Installation Support.

(1) Test Facilities. (For example, describe test ranges, firing ranges, maneuver areas.)

(2) Installation Support.

(a) General. (List required rental vehicles, supply and maintenance support, audio-visual support, administrative support (e.g., safes, desks, typewriters) and administrative facilities support (e.g., offices, briefing space); exclude data collection or data processing contract support.)

ITEM	QTY	INCL DATES (Use T-Dates)	SOURCE

(b) ADP Support (Administrative).

(c) Facility Engineer and Post Signal Officer.

d. Items(s) to be Tested. (List all test items and their unique logistic support requirements for use in testing.)

(1) Test Items.

DESCRIPTION	APPN (RDTE, Stock Fund,OMA)	QTY	INCL DATES (Use T-Dates)	SOURCE

(2) Support Requirements. (Include contract support, materiel developer maintenance teams, special maintenance support equipment, repair or renovation of test items following the test, transportation to and from test site, and spare and repair parts.)

DESCRIPTION	QTY	INCL DATES (Use T-Dates)	SOURCE

e. Data Collection, Processing, and Analysis. (Describe resources to collect, process, and analyze test data. Include the development, design, purchase, installation, rental, and operation of instrumentation and ADP systems, and studies and analysis.)

(1) ADP Facility support.

(2) Data Collection/Processing Systems.

INSTRUMENTATION/SYSTEM	QTY	INCL DATES (Use T-Dates)	SOURCE

ADP EQUIPMENT	QTY	INCL DATES (Use T-Dates)	SOURCE

(3) Contractor or Other Services. (Include AUTOVON and WATS lines required for data collection and organizations assisting in data collection.)

SERVICE	INCL DATES (Use T-Dates)	SOURCE

f. Ammunition, Missiles and Pyrotechnics. (Include ammunition and missiles supporting the test (exclude test items themselves).)

DESCRIPTION	DODIC (last 4 letters of DOD Ammo Code)	APPN (RDTE, Stock Fund, OMA)	QTY	DATE RQD (Related to T-Date)	SOURCE

g. POL Supplies.

DESCRIPTION (JP4, MOGAS, DIESEL, etc)	QTY	(GAL and Liters)	LOCATION (Where POL is required)

h. Other Resources Required. (Describe other resource requirements not included above.)

(1) Test Support Package (TSP). (Specify requirements for test support packages, using para. 3-24b and c, AR 71-3 for guidance.)

(2) Special Pretest Troop Package. (Pretest troop training required for test execution includes new organizations and doctrine, tactics, and training programs.)

(3) Simulators, Targets and Other Special Equipment.

(4) Contract Studies or Support.

(5) Photographic Support. (Including Documentary Film requirements.)

(6) SIGSEC/OPSEC Implications.

(7) Morale Support Activities. (Includes expansion of services, modification of hours of operation, supplies, and booking tours and concerts).

(8) Other. (Include any required operational readiness statements and safety releases.)

i. ADATS. (Air Defense Artillery Threat Simulator requirements.)

6 **TEST MILESTONES.** (Key events in the test cycle; applicable pacing actions; e.g., test design plan, detailed test plan, activate test directorate, test equipment availability, TSP/OTRS due dates, NET availability date, instrumentation/special equipment availability, safety release, statement of pretest troop training, conduct of OT, conduct of DT, test report, independent evaluation, IPR or ASARC/DSARC.)

EVENT	RESPONSIBILITY	DATE (Use T-Dates)

7. **COST SUMMARY.** ($ in Thousands) Supported by cost estimate. (See Chap. 6 and App. G, AR 71-3.) A sample test cost estimate form is given as Figure A-1-A-1.

	FY __	FY __	FY __
OMA	$	$	$
RDTE			
APA	------	------	------
TOTAL	$	$	$

8. **POINTS OF CONTACT.** (Should always include OTEA: DA Staff proponent, DALO-TSE, DALO-LEI, DAMO-_____, DAMA-_____, test proponent; command agency responsible for test management; test installation; test organization; and other commands and agencies, as appropriate.)

AGENCY	OFFICE SYMBOL	LOCATION	TELEPHONE (AV)

(CLASSIFICATION)

TEST COST ESTIMATE

DATE COST ESTIMATE PREPARED: _____

TEST TITLE: _____ OTP DATED: _____

NOTE: FUND REQUIREMENTS REFLECTED BELOW PROVIDE FOR DIRECT COST OF THE TEST INCREMENT ONLY. ESTIMATES BELOW ARE BASED UPON, AND PROVIDE FUNDS TO SUPPORT, ONLY THOSE RESOURCES REQUIRED IN PARAGRAPH 5 OF THE OUTLINE TEST PLAN.

CATEGORY OF COST	APPN	P/B BY	P/E OR LINE ITEM NR.	$ IN THOUSANDS FY ___	FY ___	FY ___
1. TEST DIRECTORATE						
2. PLAYER PARTICIPANTS						
3. TEST FACILITIES/BASE OPS SPT						
4. ITEM (S) TO BE TESTED* a. PROCUREMENT OF PDTN ITEMS b. SUPPORT OF PDTN ITEMS c. SUPPORT OF PROTOTYPE ITEMS						
5. DATA COLLECTION, PROCESSING, & ANALYSIS a. PURCHASE OF INSTRUMENT SYS b. OTHER (EQUIP RENTAL, CONTRACT SUPPORT, ETC.)						
6. AMMUNITION/MISSILES (EXCLUDES ITEMS TO BE TESTED)						
7. OTHER COSTS a. PRETEST TRAINING b. SIMULATORS, TARGETS, & SPECIAL EQUIPMENT c. CONTRACT STUDIES, TECH SPT d. PHOTOGRAPHIC SPT e. OTHER (POL)						
8. TOTALS a. OMA b. RDTE c. ~~PEMA~~ APA (PROCUREMENT) d. GRAND TOTAL						

*COST OF PROTOTYPES ARE NOT INCLUDED. APPLICABLE COSTING INFORMATION MAY BE OBTAINED BY REFERRING TO THE APPROPRIATE FINANCIAL PLAN OF THE (SYSTEM) DEVELOPMENT PLAN.

		FY ___	FY ___	FY ___
Travel Cost	2100	$	$	$
	2200			
Total		$	$	$
Ammunition Cost		$	$	$

81-OT-XXX-6

USAOTEA FORM 12 15 JAN 74

(CLASSIFICATION)

Figure A-1-A-1. SAMPLE TEST COST ESTIMATE FORM

ANNEX 2 TO APPENDIX A

TYPICAL CONTENTS AND FORMAT FOR CDEC TEST DESIGN PLANS AND DETAILED TEST PLANS.

1. GENERAL. This annex presents a description of the typical contents for CDEC test design plans and detailed test plans as derived from TRADOC Reg 71-9. An outline is given in Table A-2-1.

2. CONTENTS OF CHAPTERS.

CHAPTER 1. INTRODUCTION.

This chapter contains the introductory information necessary for preparing and evaluating the test plan. A large part of this information is derived or extracted from other published documents, as indicated under paragraph headings below.

1.1 PURPOSE.

Derived from paragraph 2 of the TSARC-approved OTP. The purpose states why the test is required and what will be done with test results.

This paragraph is the same for both the test design plan and the detailed test plan.

1.2 BACKGROUND.

As applicable, extract from the IEP and update the history, considerations, and actions leading up to the development of the test system. Discuss previous tests conducted on the system and test results that are significant in the present context. Make reference to the outline development plan or IEP as the source documents which identify issues to be examined through testing, and the planned testing to resolve these issues. Describe the concept for employment of the test system and its use as a replacement for, or

Table A-2-1. TYPICAL OUTLINE FOR TEST DESIGN PLANS AND DETAILED TEST PLANS

CHAPTER 1 - INTRODUCTION

1.1 PURPOSE
1.2 BACKGROUND
1.3 DESCRIPTION OF ITEM/SYSTEM/CONCEPT
1.4 TEST OBJECTIVES
1.5 SCOPE AND TACTICAL CONTEXT

CHAPTER 2 - TEST DESIGN SUMMARY

2.1 TEST CONDITIONS
  2.1.1 Factors and Conditions
  2.1.2 Events

2.2 DATA REQUIREMENTS
  2.2.1 Types of Data
  2.2.2 Dendritic Structure of Required Data

2.3 DATA HANDLING
  2.3.1 Summary of Analysis Plan
  2.3.2 Form of Data Presentation

CHAPTER 3 - TEST PHASES OR SUBTESTS

3.1 (1st Phase or Subtest)
3.2 (2nd Phase or Subtest)

Table A-2-1. (Concluded)

APPENDIX A - OUTLINE TEST PLAN
APPENDIX B - ANALYSIS OF OBJECTIVES
APPENDIX C - TEST ISSUES AND ASSOCIATED CRITERIA
APPENDIX D - SUPPORT REQUIREMENTS
APPENDIX E - TRAINING REQUIREMENTS
APPENDIX F - TEST SCENARIO
APPENDIX G - DATA COLLECTION FORMS
APPENDIX H - ENVIRONMENTAL IMPACT ASSESSMENT/STATEMENT (EIA/EIS)
APPENDIX I - COORDINATION
APPENDIX J - REFERENCES
APPENDIX K - ABBREVIATIONS AND GLOSSARY
APPENDIX L - DISTRIBUTION

NOTE: If any of the above paragraphs/appendixes are unnecessary, the headings may be omitted and other paragraphs/appendixes renumbered accordingly. Other paragraphs/appendixes may be included as considered appropriate.

supplement to, existing systems. Include all information required to insure that all concerned test organizations are aware of all plans and commitments critical to the successful completion of the test project.

1.3 DESCRIPTION OF ITEM/SYSTEM/CONCEPT.

As applicable, obtain from the materiel developer or extract from the IEP and/or CEP RS and update. Describe the item/system/concept in terms of physical and operational characteristics. If several major components are involved, these are identified and described separately.

This paragraph is the same for both the test design plan and the detailed test plan.

1.4 TEST OBJECTIVES.

Extract from the OTP. These are the broad objectives that have been derived from critical and operational issues (AR 71-3).

1.5 SCOPE AND TACTICAL CONTEXT.

Derive from paragraph 4 of the OTP and update as applicable.

CHAPTER 2. TEST DESIGN SUMMARY (May be omitted if unnecessary/redundant.) See Appendix K to TRADOC Reg 71-9 for details and further definition.

CHAPTER 3. PHASES OR SUBTESTS.

Test plans for user testing are designed to provide for the resolution of approved issues regarding the operational effectiveness of a system or concept. Specific issues for testing are established by the headquarters responsible for the test, and are stated as test objectives in the outline test plan (OTP). The test plan is developed around a core comprising these objectives. See Appendix K to TRADOC Reg 71-9 for details.

3. **CONTENTS OF APPENDIXES.** Individual appendixes are developed for information that is pertinent to the test plan, but are too voluminous or extensive to be placed in the main body of the plan. A listing of typical appendixes that may be considered for inclusion is shown below.

Both the test design plan and the detailed test plan should normally include appendixes for the Objectives, Test Issues and Associated Criteria, and the Distribution List. Other appendixes may be included as considered appropriate. A coordination appendix for TDP is mandatory.

APPENDIX A. OTP OR LETTER OF EXECUTION (LOE).

This appendix should contain the outline test plan or letter of execution, as appropriate. If the test has an approved OTP in the FYTP, then this becomes the tasking document and an LOE will not normally be used. Test report management system forms (TRMS) accompanying the letter of execution are not included.

This appendix is the same for both the test design plan and the detailed test plan.

APPENDIX B. ANALYSIS OF OBJECTIVES.

The analysis of objectives is the detailed refinement of test objectives into data requirements that can be answered during the test. For details and further definition see Appendix K to TRADOC Reg 71-9.

APPENDIX C. TEST ISSUES AND ASSOCIATED CRITERIA.

This appendix contains lists of issues for test and the criteria to be tested against. It is the same for both the test design plan and the detailed test plan. For further definitions and details see Appendix K to TRADOC Reg 71-9.

APPENDIX D. SUPPORT REQUIREMENTS.

In the TDP, this appendix is used only when necessary to show additions, deletions, or changes to the test resources requirements shown in the outline test plan (OTP). If the alterations are extensive, the complete support requirements are relisted, using the format of paragraph 5 of the OTP. Insure that all resources required to execute the test are listed.

Appendix D of the detailed test plan will be significantly larger than the "Support Requirements" appendix in the test design plan. The purpose of the DTP support plan is to identify all personnel and equipment that will be required for the test, to specify the time frame during which each resource category must be available, and to indicate how these resources will be managed. The preparation of the support plan is actually conducted as a part of the development of all the preceding plans; i.e., control, evaluation, data collection, data reduction, training, and communications. The support plan is finalized by consolidating all of these previously identified requirements, by eliminating duplication, and by determining the required availability time from the test schedule. Guidance on supply and property procedures for test support is contained in CDEC Reg 700-3 (Reference 5.a). The support plan will have two elements.

(1) The Personnel and Materiel Requirements Document (PAMRD). (The format and content is provided in CDEC Reg 71-2.)

(2) The Administrative/Logistics (Admin/Log) Plan.

The Admin/Log Plan provides detailed management directives to implement the PAMRD in the following areas as a minimum:

- Organization.
- Clothing and equipment.
- Morale support.
- Class IX.
- Buildings/furnishings.
- Maintenance.

- Sample forms.
- Reception/departure.
- Awards.
- Reproduction and distribution.
- Mail/courier.
- Efficiency rating schemes.
- Physical security.
- Public affairs.
- Safety.
- Maneuver procedures.
- Signal.
- Medical support.
- Military police support.

Because the Admin/Log plan is often voluminous, it may be published under separate cover and referenced in the DTP. It is, however, an integral part of the DTP and must be completed during the detailed planning phase of the experimentation process.

APPENDIX E. TRAINING REQUIREMENTS.

The test design plan should not include this appendix unless a knowledge of training requirements is essential for the reviewer to evaluate the proposed test design. If included, the guidance at Appendix T to TRADOC Reg 71-9 is germane.

This appendix describes the training necessary for accomplishment of the test, and identifies the resources required to conduct the training.

Review the Test Support Packages and identify the skills that will be needed by players (typical test troops), aggressors, controllers, data collectors, and data reducers. Include requirement for new equipment training and any other specialized training. For all tests, the actual training received by player personnel is documented and becomes a part of the test report.

For the detailed test plan, include lesson plans, instructor requirements, and training schedules.

APPENDIX F. TEST SCENARIO.

A scenario is essentially a synopsis of proposed test events and the tactical environments and sequence in which they will occur. The scenario describes the actions of all players and opposing force units.

All preplanned information that will be presented to the players is included. This includes the initial and update situation briefings, operations orders, fragmentary orders, intelligence summaries, messages, and other information designed to evoke player response.

Particular attention must be given to the actions of opposing forces (OPFOR). Their operations must in all cases be consistent with the tactics of the threat force being considered to insure testing is conducted in the most realistic battlefield environment possible. All scenarios must be based on one of the TRADOC standard scenarios (SCORES).

The scenario includes all test events that are specified in the method paragraph of each subtest in Chapter 3 of the test plan. A listing of the required test events may constitute the scenario for the test design plan; for the detailed test plan, a more detailed scenario is developed. In preparing the detailed scenario, the time and location of each planned event is specified.

The organization and level of detail in the scenario depend upon the level of simulated realism required. Higher levels of simulated realism will require higher degrees of control to insure the test events occur as scheduled. The scenario should include a description of the control procedures and rules of engagement that will be employed to insure that required events occur in situations which realistically depict the tactical context of the test.

APPENDIX H. ENVIRONMENTAL IMPACT ASSESSMENT/ENVIRONMENTAL IMPACT STATEMENT (EIA/EIS).

This appendix includes pertinent information regarding the environmental impact whenever the EIA reveals that the test may significantly affect the quality of the human environment or may be controversial with regard to its environmental impact.

APPENDIX I. COORDINATION.

It is mandatory that this appendix be included in the test design plan (TDP). Inclusion in the detailed test plan (DTP) is optional unless specifically required by the approving headquarters (HQ TRADOC or OTEA).

This appendix includes the following information:

a. All agencies with which the test organization coordinated the test design plan (includes the logistics center/school providing the logistics support concepts).

b. A listing of substantive comments from each agency. Editorial comments (e.g., typographical errors and minor word changes for added clarity)
are not included.

c. After each comment, an explanation of comments accommodated and identification of paragraphs changed to accommodate the comment are stated. If the comment was not accommodated or is unresolved, the rationale for this decision will be stated.

APPENDIX J. REFERENCES.

This appendix is included in the test design plan only when the references cited in the test are so numerous that a summary listing of them is considered beneficial to the reviewer in determining the adequacy of the proposed test design. In this regard, consideration is given to the availability of references listed in the OTP.

When this appendix is not included in the test design plan, it is not prepared solely for the detailed test plan.

When used the list of references will be kept to a minimum; from the categories of information below, only those items mentioned in the text of the plan are included in this appendix:

a. Correspondence.

b. Previous RDTE projects.

c. Previous test plans and reports.

d. Materiel requirements documents.

e. Other sources of appropriate information.

APPENDIX K. ABBREVIATIONS AND GLOSSARY.

This appendix consists of all acronyms, brevity codes, short titles, abbreviations and uncommon terms used in the test plan, listed in alphabetical order, by category, with an explanation of their meaning.

This appendix is included in the test design plan only when considered essential to a clear understanding of the document. When not included in the test design plan, it is not prepared solely for the detailed test plan.

APPENDIX L. DISTRIBUTION LIST.

The distribution list is always the last appendix to the test design plan and the detailed test plan.

Before the test plan is published, the distribution list is verified with the proponent, HQ TRADOC (ATCD-T), and/or the test sponsor. Copies for accredited U.S. liaison officers

are included in the distribution list. Foreign nationals, governments, or firms are not included in distribution lists for test plans or test reports.

The total number of copies for internal distribution within CDEC is included in the distribution list when the test plan is published. Detailed test plans are not normally distributed outside the command. See Annex 8 to this appendix.

ANNEX 3 TO APPENDIX A

TYPICAL CONTENTS AND FORMATS FOR CDEC TEST REPORTS

1. **GENERAL.** The most typical and most important end product of a CDEC experiment is a formal test report. The following paragraphs discuss in detail the content of a typical CDEC final test report. (See Table A-3-1 for content outline.) This outline is excerpted from Appendix M of TRADOC Reg 71-9 which should be consulted for details. TRADOC Reg 71-9 also states: "... If any paragraphs are unnecessary, the headings may be omitted and other paragraphs renumbered accordingly. Additional paragraphs may be added when required." When the information for a specific appendix is not required, this appendix may be omitted and subsequent appendixes relettered accordingly. Additional appendixes may be added when required.

2. **CONTENTS OF CHAPTERS.**

a. Chapter 1. Executive Summary.

(1) The executive summary is a condensation of the main body of the test report. For decision makers, it is perhaps the only chapter of the report that will be read. For specialists who will read the complete report, it serves as a guide for determining key points to be reviewed and evaluated. This chapter should provide a clear understanding of the purpose of the test, how it was conducted, what significant findings the test uncovered, and which criteria were not met.

(2) The executive summary must be concise, yet contain enough information about all aspects of the test so that it can stand alone. The reader should be able to get the meaning of the test without referring to other parts of the report. The remainder of the report should be needed only when the reader desires additional information. In view of this, the executive summary (especially the Major Findings paragraph) includes references to applicable paragraph(s) in the report where the additional information can be found.

Table A-3-1. TEST REPORT OUTLINE

CHAPTER 1 - EXECUTIVE SUMMARY

1.1 PURPOSE
1.2 BACKGROUND
1.3 DESCRIPTION OF SYSTEM/CONCEPT
1.4 OBJECTIVES
1.5 SCOPE AND TACTICAL CONTEXT
1.6 MAJOR FINDINGS
1.7 OBSERVATIONS AND COMMENTS

CHAPTER 2 - SUBTESTS

2.1 (NAME OF FIRST INDIVIDUAL SUBTEST)
2.1.1 Objectives
2.1.2 Issues and Associated Criteria
2.1.3 Method
2.1.4 Results
2.1.5 Analysis
2.1 (NAME OF SECOND INDIVIDUAL SUBTEST)
2.2.1 Objectives
etc.

APPENDIX A - TEST DATA
APPENDIX B - ISSUES AND ASSOCIATED CRITERIA
APPENDIX C - DEFICIENCIES, SHORTCOMINGS, AND SUGGESTED IMPROVEMENTS
APPENDIX D - RAM DATA AND COMPUTATIONS
APPENDIX E - SCENARIO
APPENDIX F - TRAINING OF PLAYER PERSONNEL
APPENDIX G - PERSONAL ASSESSMENTS BY TEST PERSONNEL
APPENDIX H - REFERENCES
APPENDIX I - ABBREVIATIONS/GLOSSARY
APPENDIX J - DISTRIBUTION

(3) The executive summary does not contain test results that are not included in of Chapter 2; therefore, the text of Chapter 2 should not contain any references to the executive summary.

(4) A large part of the introductory information in this chapter may be derived from the test design plan, with applicable updating, as indicated under the paragraph headings below.

(a) 1.1 PURPOSE. Same as in paragraph 1.1 of the test design plan.

(b) 1.2 BACKGROUND. Same as in paragraph 1.2 of the test design plan, updated as applicable. Authority to conduct the test, and any information available after the test plan was issued is included. The relationship of this test to tests previously conducted should be discussed.

(c) 1.3 DESCRIPTION OF SYSTEM/CONCEPT. Same as in paragraph 1.3 of the test design plan, updated to reflect the configuration of the system as tested. Illustrations are presented to clarify the description of the system/concept. Modifications made to the test item during conduct of the test are identified. A summary description of the test, test personnel, and test limitations is included.

(d) 1.4 OBJECTIVES. Same as in paragraph 1.4 of the test design plan.

(e) 1.5 SCOPE AND TACTICAL CONTEXT. This paragraph is a general summary of the testing described in the individual subtests of Chapter 2. The information is similar to that in paragraph 1.5 of the test design plan. Changes from the test plan, test methods, time duration of test, or number of test samples are noted. The information given here describes the conditions which actually prevailed during test execution and data collection. An assessment of the environmental impact of testing the item/system is stated as required by AR 11-21. As a minimum, a statement that environmental consequences have been assessed is included. For large and complex tests, particularly for major systems, a written assessment is presented as an appendix to the test report.

(f) 1.6 MAJOR FINDINGS. This paragraph summarizes the findings of the test. Only those findings from Chapter 2 which most comprehensively summarize the test data, both numerical and descriptive, are presented here. This paragraph summarizes and consolidates many individual findings from the subtests. Figures, graphs, and charts are used as much as possible to present these findings briefly and compactly. These results are referenced to the source paragraphs in Chapter 2.

Summary statements are made regarding the critical issues examined during the test and, when applicable, for characteristics specified in materiel requirements documents.

(g) 1.7 OBSERVATIONS AND COMMENTS. See paragraph 4h(3) to TRADOC Reg 71-9.

b. Chapter 2. Subtests.

(1) This chapter consists of the individual subtests, with separate paragraph headings for each subtest, in the same sequence as the test design plan. The subparagraph headings within each subtest are the same as in the TDP, except that "Data Required" is now changed to "Results," and "Data Reduction and Analysis" is changed to "Analysis." This similarity of paragraphing in the two formats facilitates converting the test plan into the test report upon completion of the test.

(a) 2.1 (NAME OF INDIVIDUAL SUBTEST). Same as in the comparable paragraph of the test design plan.

(b) 2.1.1 Objectives. Same as in the test design plan.

(c) 2.1.2 Issues and Associated Criteria. Same as in the test design plan.

(d) 2.1.3 Method. Same as in the test design plan, except that verbs are changed to past tense and the text is updated to describe the test events, conditions, and

methods actually used in conducting the test. Significant deviation from the test methodology described in the test plan is explained. Reasons for not conducting any subtest described in the test plan also are explained.

(e) 2.1.4 Results. Test results are cited in this paragraph. Whenever possible, the results are presented in tabular or graphic form in preference to extensive prose presentation. Sufficient information must be included to clearly describe the results obtained during the test. Ideally, all test findings, both numerical and descriptive data, should be placed in Appendix A, Test Data. In all cases, there must be sufficient data to support the rationale applied in the Analysis paragraph which follows.

(f) 2.1.5 Analysis. The information in this paragraph bridges the gap between the test results and the major findings. Included are necessary interpretations or discussions of test results and an explanation of the statistical methods used in the analysis. For each step in the analysis that requires an intermediate or final determination (or decision), the applicable criteria or considerations used in reaching the finding are cited.

(g) Additional Subtests. As Table A-3-1 illustrates, the above sequence of paragraphs is repeated for the 2nd subtest, and again for subsequent subtests.

3. CONTENTS OF APPENDIXES.

a. Appendix A - Test Data. This appendix contains detailed test results, tables, charts, listings, and illustrations that are too lengthy or numerous to be included in the main body of the test report. Photographs and illustrations are identified by figure numbers and captions and arranged in the order referred to in the text. Diagrams and illustrations are employed to depict test conditions and clarify reports. Examples of data forms and summaries of responses to questionnaires and interviews are included when pertinent to a clear understanding of the analyses and findings. To assist readers in locating and reviewing the information contained in this appendix, the information is grouped by related material within separate sections of the appendix.

b. Appendix B - Issues and Associated Criteria. This appendix contains statements of findings regarding the issues and associated criteria for tests addressed in the subtests of Chapter 2 of the report. The formats are the same as those prescribed for Appendix B, Issues and Associated Criteria, of the TDP. The degree to which the issues/criteria for test were satisified are entered in the remarks column and the test data applicable to the issues will be summarized. References are made to the applicable subparagraph of the subtest which addressed the issue.

c. Appendix C - Deficiencies, Shortcomings, and Suggested Improvements. Equipment deficiencies and shortcomings found during the test, and suggested improvements are listed in this appendix. The terms deficiency and shortcoming (as defined in AR 310-25) must be used judiciously. Normally safety characteristics are classified as deficiencies if they present catastrophic or critical hazards, and as shortcomings if only marginal hazard levels are involved. (See MIL-STD-882 for hazard level classification.) Failure to meet criteria is not in itself sufficient basis for classification as a deficiency or a shortcoming.

d. Appendix D - Ram Data and Computations. User testing assesses the reliability, availability, and maintainability (RAM) performance characteristics upon exposure of the materiel to a variety of expected operational conditions (AR 71-3). The scope of the RAM evaluations varies depending on the type of test or the test phase being conducted. When required, the RAM evaluation is included in the test plan and report as a subtest. The data forms, charts, maintenance records, or other RAM data that are too voluminous or extensive for inclusion in the main body of the report are placed in this appendix. The results of the OT Scoring Conference(s) are included here.

e. Appendix E - Scenario. For this appendix, the same scenario that was in the test design plan is updated to reflect the actual events, times, locations, and conditions that occurred during the test. The exploratory trials portion of the scenario normally is not shown in this appendix. However, any usable data that was collected during conduct of the exploratory trials is included in the applicable subtest report.

f. Appendix F - Training of Player Personnel. For user testing, the training of player personnel should concentrate on providing the skills necessary to operate the

equipment, maintain the equipment, or perform the tactics or operations to be tested. The results of the test are affected by the amount and quality of player training. In fact, for some tests, the amount and type of training received by various groups of players is a major test variable. For all tests the actual training received should be documented and become a part of the final report. When the test data is extensive, it may be placed in this appendix. The test data should describe the actual training received by player personnel. Included are the subjects, lesson plans, training schedules, time required, special training aids or devices that are used, and (when applicable) special qualifications of the instructors. (The Operational Test Readiness Statement (OTRS) may be included in the appendix.)

g. Appendix G - Personal Assessments by Test Personnel. The test report may contain the logical assessments or observations of knowledgeable individuals based on their observations (e.g., test director, project officer, engineers) in a separate appendix. These individuals should be available to the decision review.

h. Appendix H - References. This list is kept to a minimum. From the categories of information below, only those items mentioned in the text of the report are included in this appendix.

(1) Correspondence.

(2) Previous related RDTE projects.

(3) Materiel requirements documents.

(4) Previous test plans and reports.

(5) Other sources of relevant information.

i. Appendix I - Abbreviations and Glossary. All acronyms, brevity codes, short titles, abbreviations, and uncommon terms used in the final test report are listed in alphabetical order with an explanation of their meanings.

j. Appendix J - Distribution. The distribution is always the last appendix to the test report. See Annex 8 to Appendix A for details.

4. **CONTENTS OF LETTER REPORT.** An outline of the typical contents for a letter report is presented in Figure A-3-1. Guidelines for paragraph contents in standard test report (as discussed in this annex) are also applicable to a letter report.

DEPARTMENT OF THE ARMY

HEADQUARTERS
US ARMY COMBAT DEVELOPMENTS EXPERIMENTATION COMMAND
FORT ORD, CALIFORNIA 93941

REPLY TO ATTN OF

ATEC-

SUBJECT: (Final/Other) Report of (Innovative Test/Operational Feasibility Test/Other Test) of (Test System of Concept Nomenclature), (TRADOC ACN/Other Identifying Project Number).

SEE DISTRIBUTION

1. REFERENCES.

2. BACKGROUND.

3. DESCRIPTION OF TESTED SYSTEM/CONCEPT.

4. TEST OBJECTIVES.

5. METHODOLOGY.

6. RESULTS/FINDINGS.

(Inclosures may be added as appropriate.)

Figure A-3-1. TYPICAL CONTENTS OF LETTER REPORT

ANNEX 4 TO APPENDIX A

PARAGRAPHING STYLE FOR CHAPTERS OF CDEC TEST PLANS AND REPORTS

1.1 **FIRST LEVEL PARAGRAPH.** The subhead (paragraph title) at this level is in all capital letters. The text begins two spaces after the subhead as shown here. Two spaces are always provided between the paragraph identifier and the first word of the subhead or the first word of text if no subhead is used. The second and subsequent lines of all paragraphs are typed flush with the left margin. The first digit of the paragraph identifier denotes the chapter (2.1 would identify the first paragraph of Chapter 2). The typing format including spacing and tab sets is presented in Table A-4-1.

1.1.1 **Second Level Paragraph.** Subheads, if used, at this level are typed in initial caps only (as shown) and the subhead is underlined. The paragraph identifier is indented 5 spaces from the left margin.

1.1.2 **Second Level Paragraph.** There must be at least two paragraphs at any given level (i.e., here there is a paragraph 1.1.1 so there must be a paragraph 1.1.2).

1.1.2.1 Third Level Paragraph. Subheads (also not required) at this level are typed in initial caps but are not underlined. The paragraph identifier is indented 9 spaces from the left margin.

1.1.2.2 Third Level Paragraph. If one subparagraph at a given level has a subhead, all subparagraphs at that level must have subheads.

1.1.2.2.1 The fourth level paragraph identifier is indented 15 spaces from the left margin as are all subordinate levels.

1.1.2.2.2 Elements of a list within any level may be identified with lower case letters in parentheses and further subordinated with arabic numeral identifiers in parentheses. Indentation of the main elements of the list should be the same as for the paragraph identifier. Paragraph 1.1.2.2.3 demonstrates the use of a list.

Table A-4-1. TYPING FORMAT FOR CHAPTERS

1.1 FIRST LEVEL PARAGRAPH.

1.1.1 . . . . . .

1.1.1.1 . . . . . .

1.1.1.2 . . . . . .

1.1.2 . . . . . .

1.1.2.1 . . . . . .

1.1.2.1.1 . . . . . .

1.1.2.1.1.1 . . . . . .

1.1.2.1.1.2 . . . . . .

1.1.2.1.2 . . . . . .

1.1.2.2 . . . . . .

1.1.3 . . . . . .

1.2 FIRST LEVEL PARAGRAPH.

Etc.....

TAB SETS

Set margin one inch from left edge of paper
Set first tab 5 spaces from margin
Set second tab 9 spaces from margin
Set third tab 15 spaces from margin

1.1.2.2.3 Meteorological Parameters.

(a) Wind
  (1) Direction
  (2) Velocity
(b) Visibility
(c) Temperature
  (1) Dry Bulb
  (2) Wet Bulb

1.1.2.2.4 Fourth Level Paragraph. Elements of a list at any level may alternatively be designated by "bullets" if the list is not intended to show priorities. Paragraph 1.1.2.2.5 demonstrates the use of bullets.
The row of bullets is centered under the first character of the paragraph identifier.

1.1.2.2.5 Meteorological Parameters.

- Wind
  - o Direction
  - o Velocity
- Visibility
- Temperature
  - o Dry Bulb
  - o Wet Bulb

1.1.2.2.5.1 Fifth Level Paragraph. This level paragraph should be used sparingly. Except in unusual circumstances, paragraphing to this level suggests a need to rewrite.

1.2 SUBHEADINGS.

1.2.1 If no subhead is used (at any level), the text begins two spaces after the paragraph identifier.

1.2.2 Since subparagraph 1.2.1 has no subhead, no subheads will be given to any subparagraphs at this level.

2.1 (X) SECURITY MARKINGS.

2.1.1 (X) In a section of a document (chapter, appendix, annex, or tab) where any portion of the section is classified, all paragraphs must bear a classification identifier as shown here. (U) = Unclassified; (C) = Confidential; (S) = Secret.

2.1.2 (X) If an entire section of an otherwise classified document is entirely unclassified, the paragraph security markup may be omitted. However, the lower right hand corner of the first page of the section must bear the statement "THIS ENTIRE (CHAPTER, APPENDIX, etc.) IS UNCLASSIFIED."

2.1.3 (X) Section titles, table headings, and figure captions in a classified document must be marked as shown below.

CHAPTER 1
(X) EXECUTIVE SUMMARY (Y)

Table 3-1. (X) EFFECTIVE RANGE (Y)
Figure A-6-1. (X) TEST LAYOUT (Y)

Note: (X) is the classification of the contents of the section, table, or figure. (Y) pertains to the classification of the title, heading, or caption.

ANNEX 5 TO APPENDIX A

PARAGRAPHING STYLE FOR APPENDIXES, ANNEXES, AND TABS IN CDEC TEST PLANS AND REPORTS

1. **GENERAL.** This annex presents the paragraphing style to be used for the appendixes, annexes, and tabs of all test design plans, detailed test plans, and test reports. The typing format including spacing and tab sets is presented in Table A-5-1.

2. **FIRST LEVEL PARAGRAPH.** The subhead (paragraph title), if used, is in all capital letters. The first letter of the subhead is indented 5 spaces from the left margin. This indentation is required to provide uniformity with the spacing for first level paragraphs in the basic text. (This compatability is desirable when setting the program disc for the CRT word processing machine.)

a. **Second Level Paragraph.** The paragraph identifier is typed with a five space indentation from the left margin. The subhead, if used, is typed in initial caps and underlined, as shown.

b. **Second Level Paragraph.** Since there is a subparagraph a, there must be a subparagraph b. Since subparagraph a has a subhead, subparagraph b must also have a subhead.

(1) Third Level Paragraph. The identifier for this level is indented 9 spaces from the left margin. The subhead, if used, is typed in initial caps but not underlined.

(2) Third Level Paragraph. Since there is a subparagraph (1) there must be a subparagraph (2).

(a) Fourth Level Paragraph. The subhead at this level is typed in initial caps but not underlined. The paragraph identifier is indented 15 spaces from the left margin.

Table A-5-1. TYPING FORMAT FOR APPENDIXES, ANNEXES, AND TABS

1. **FIRST LEVEL PARAGRAPH.**

a. . . . . .

(1) . . . . . .

(a) . . . . . .

1. . . . . .

a. . . . . .

b. . . . . .

2. . . . . .

(b) . . . . . .

(2) . . . . . .

b. . . . . .

2. **FIRST LEVEL PARAGRAPH.** . . . . . .

TAB SETS

Set margin one inch from left edge of paper
Set first tab 5 spaces from margin
Set second tab 9 spaces from margin
Set third tab 15 spaces from margin

(b) Fourth Level Paragraph.

1. Fifth Level Paragraph.

a. Sixth Level Paragraph. Fifth and sixth level paragraphs should be used sparingly. Except in unusual circumstances, paragraphing to these levels suggests a need to rewrite.

(3) Use of Bullets. Elements of a list (at any level) may be designated by "bullets" if the list is not intended to show priorities. Paragraph (a) below demonstrates the use of "bullets."

(a) Meteorological Parameters.

- Wind
  - o Direction
  - o Velocity
- Temperature
  - o Dry Bulb
  - o Wet Bulb

3. **SECURITY MARKINGS.** The same rules apply as for marking classified portions of chapters.

ANNEX 6 TO APPENDIX A

GUIDELINES TO TABLES, FIGURES, AND EQUATIONS

1. **DEFINITION.** The principal difference between tables and figures is that tables are produced entirely from type (plus margin or column lines) whereas figures require some degree of artwork. Bargraphs, charts, maps, photos, and line drawings are examples of figures. Any material placed in a document as an example is considered a figure (such as a sample form or example message).

2. **TABLE HEADINGS.** Table headings should be brief and concise and are always placed above the table. Only the "T" in "Table" is capitalized, followed by the number and a period. Two spaces are left between the period and the table heading which is typed all in capital letters.

3. **FIGURE CAPTIONS.** Like table headings, figure captions should be brief and concise. Figure captions are always placed below the figure. Footnotes, when used, are placed between the lower edge of the figure and the caption. Only the first letter of the word Figure is capitalized followed by the figure number and a period. Two spaces are left between the period and the figure caption which is typed all in capital letters.

4. **SECURITY MARKINGS.** Table headings and figure captions for classified material will contain the appropriate letter, i.e., (C), (S), (TS) etc., in parentheses as shown below. (X) is the classification of the material. (Y) is the classification of the heading or caption.

Table 4-1. (X) TABLE TITLE (Y)
Figure A-2. (X) FIGURE TITLE (Y)

5. **NUMBERING.** Tables and figures are numbered sequentially within each part (chapter, appendix, annex, or tab) of the document. The first table in Chapter 2 would be numbered Table 2-1; the third figure in Appendix D would be numbered Figure D-3; the second table in Annex 1 to Appendix C would be numbered Table C-1-2; and the fourth figure in Tab C to Annex 4 to Appendix A would be numbered Figure A-4-C-4, etc.

6. **PLACEMENT.** Normally, tables/figures are interspersed throughout the text and are placed on the page immediately following the first reference to them in the text. In the case where several references are made on a single page of text, the references tables/figures are placed after that page in order of reference. In some cases, a part of the document with only a few pages of text may reference many tables/figures. In such cases, a page of text can become lost among pages of tables/figures and the reader will lose continuity. It is appropriate, in such an instance, to place all the tables/figures in order of reference after the last page of text.

7. **REDUCTIONS.** Often a table or figure is too large to fit on a page and requires reduction. In that case the table or figure, including any footnotes and legend, will be reduced and pasted up on a page by Reports Division. The table heading/figure caption and page number are <u>not</u> reduced.

8. **FOOTNOTES.** Items to be footnoted in tables/figures are identified by a superscript astrisk if only one footnote is given. If more than one footnote is used, superscript lowercase letters are used as identifiers. The order for footnote numbering in tables or figures is from left to right and top to bottom (as you would read a book). Footnotes are placed directly below and flush with the left edge of the table/figure. The footnote identifier is placed on the same line as the footnote (not superscript).

9. **COMPUTER PRODUCTS.** Legibility is an important consideration when using computer-generated products in a document. If possible, computer-generated charts and graphs should be dimensioned to fit on a standard document page — about 6½" x 9" (after allowing for suitable margins). Usually, however, computer products must be photographically reduced in size to fit a document page. This process, unless a highly legible master is used, also reduces legibility. Only unlined computer printer paper should be used and emphasis should be placed on achieving black, crisp copy when producing computer material for use in a document. The operator should be advised when the printout will be camera-copied for publication so he can use a fresh black ribbon and proper settings.

10. **FOLD-OUT PAGES.** The use of fold-out pages in CDEC documents is discouraged unless absolutely imperative. CDEC does not have the necessary equipment to print and

fold oversize sheets which necessitates out-of-house production with its attendant high costs and considerable turn-around time. If possible, divide oversize charts/tables into logical segments for printing on standard size separate pages.

11. **EQUATIONS/FORMULAS.** Hand written draft equations and formulas should be written with special care before submission for typing. Greek letters or other symbols should be drawn carefully and legibly. Authors are encouraged to use graph paper when writing equations to assist the typist in following superscript and subscript lines.

The following is excerpted from DOD MIL-STD-847A.

a. **General.** Prepare mathematical matter with extreme care. Use machine or transfer-type composition when available. When necessary, identify symbols after first use in order to simplify reading from any type of microform, otherwise include in a separate list. Make opening and closing parentheses, brackets, and braces the same height as the tallest expression they enclose. Separate the numerator from the denominator with a line as long as the longer of the two. Center both numerator and denominator on the line.

b. **Placement.** Indent or center a displayed equation in the line immediately following the first text reference made to it. Break equations before an equal, plus, or multiplication sign. Align a group of separate but related equations by the equal signs and indent or center the group as a whole. Short equations not part of a series or identified by number will be placed in the text rather than displayed.

c. **Numbering.** Number equations that are part of a series, or that are referred to in the text, consecutively in Arabic numberals. Inclose each number in parentheses at the right margin on the last line of the equation to which it refers. Equations within appendixes should be numbered in a manner consistent with the appendix.

ANNEX 7 TO APPENDIX A

COVERS AND FRONT MATTER FOR CDEC TEST REPORTS

1. **GENERAL.** The cover and "front matter" associated with CDEC test reports are uniquely CDEC but are designed in consonance with appropriate regulations and directives of higher authority. This annex gives pertinent details of this material and presents some examples.

2. **FRONT COVER.**

a. The Front Cover of USACDEC experimentation documents (see Figures A-7-1 and A-7-2) is made up by DCSEX, Reports Division, Graphics Section in accordance with guidelines set in MIL-STD 847A and TRADOC Reg 71-9.

b. The USACDEC document number (upper left corner) is designated by Reports Division. This number is a unique alphanumeric designation provided in accordance with MIL-STD 847A to facilitate Defense Technical Information Center (DTIC) accounting.

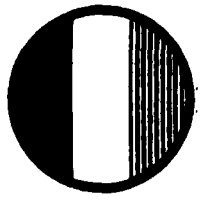
c. Security markings, if required, (see Figure A-7-2) are placed at both the top and bottom of the cover and reflect the highest level of classified material contained in the document. See Department of Defense Information Security Program Regulation, DOD 5200 1-R for detailed information regarding marking.

d. A place for the DTIC Accession ("AD") number is provided on test report covers only (since test plans are in-house documents and are not distributed to DTIC). This number is provided by DTIC subsequent to the distribution of the document.

e. The TRADOC TRMS number is provided to Reports Division by the Project Team/Project Officer.

f. The type of document (test design plan, detailed test plan, or test report is shown and the date of the document (month and year only) is given.

CDEC-TR-79-004 AD_____



TRADOC TRMS No. 0000210

THE VALUE OF MANMADE GEOGRAPHIC REFERENCES TEST (MMGR)

TEST REPORT
DECEMBER 1979

DISTRIBUTION: Limited to U.S. Government Agencies only; Test and Evaluation, December 1979. Other requests for this document must be referred to Cdr, TRADOC, ATTN: ATCS-D, Fort Monroe, VA 23651.

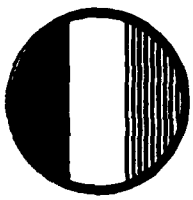
UNITED STATES ARMY
COMBAT DEVELOPMENTS
EXPERIMENTATION COMMAND
Fort Ord, California 93941

Figure A-7-1. EXAMPLE FRONT COVER

CONFIDENTIAL

CDEC-TR-81-005

AD _____



TRADOC TRMS No. 1-000-290

ADVANCED ANTIARMOR VEHICLE EVALUATION

INDEPENDENT EVALUATION REPORT

(IER-ARMVAL)

JUNE 1981

DISTRIBUTION: Limited to US Government Agencies only; Test and Evaluation, June 1981. Other requests for this document must be referred to Cdr, TRADOC, ATTN: ATCS-D, Fort Monroe, VA 23651.	Classified By: Cdr, USACDEC Declassify On: 30 June 1987

UNITED STATES ARMY
COMBAT DEVELOPMENTS
EXPERIMENTATION COMMAND
Fort Ord, California 93941

CONFIDENTIAL

Figure A-7-2. EXAMPLE FRONT COVER (CLASSIFIED DOCUMENT)

g. Distribution limitations are presented in a box centered on the lower half of the page. As a rule, distribution of USACDEC documents is limited to US Government Agencies only (Ref. DOD Directive 5200.20). Other requests (subsequent to initial distribution) for test plans are usually referred to USACDEC, ATTN: ATEC-EX-D and requests for test reports are referred to Cdr, TRADOC, ATTN: ATCS-D. Exceptions to this may be required by the proponent agency if it desires to retain release authority.

3. APPROVAL PAGE (REVERSE OF FRONT COVER).

a. General. The approval page is included only in test reports.

b. Approval Statement. The Commander's approval is normally obtained at the completion of the P&R Board. He is requested to affix his signature to a prepared letter (see Figure A-7-3) at that time.

c. Disclaimer.

(1) The following disclaimer is always used in test reports (in accordance with TRADOC Reg 71-9).

> "The findings in this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents."

(2) If a manufacturer's product is identified in the document, an additional disclaimer is required as follows:

> "The use of trade names in this report does not constitute an official indorsement or approval of the use of such commerical hardware or software. This report may not be cited for purposes of advertisement."

DEPARTMENT OF THE ARMY

HEADQUARTERS
US ARMY COMBAT DEVELOPMENTS EXPERIMENTATION COMMAND
FORT ORD, CALIFORNIA 93941

REPLY TO
ATTN OF

THE VALUE OF MANMADE GEOGRAPHIC REFERENCES TEST (MMGR)
TEST REPORT, December 1969

APPROVED:

(Commander's
Signature
Block)

DISCLAIMER

The findings in this report are not to be construed as an official department of the Army position unless so designated by other authorized documents.

DISPOSITION INSTRUCTIONS

This document should be destroyed when no longer needed. Do not return to originator.

Figure A-7-3. EXAMPLE APPROVAL PAGE (REVERSE OF FRONT COVER)

d. Disposition Instructions. The following disposition instructions shall be given in accordance with TRADOC Reg 71-9.

(1) Unclassified Document.

"Destroy this report when it is no longer needed. Do not return it to the originator."

(2) Classified Document.

"When this document is no longer needed, Department of the Army organizations will destroy it in accordance with the procedures given in AR 380-5. Other agencies will destroy it in accordance with the applicable regulations of their services."

4. REPORT DOCUMENTATION PAGE - DD FORM 1473.

a. The Report Documentation Page is presented as the first right-hand page after the cover in each test report and serves the purpose of a title page (Ref. DOD MIL-STD 847A). This page is not numbered.

b. Since this page is used in preparing announcements, biblographies, and data banks, it should be unclassified if possible. If a classification is required, the classified items on the page will be identified by appropriate classification markings. (Ref. DOD MIL-STD 847A.)

c. The report documentation page is completed by the DCSEX Reports Division except for the following items which are provided by the project team.

(1) Item 11 - Controlling Office Name and Address. The proponent for a CDEC test is given as the Controlling Office.

(2) Item 19 - Key Words. Select terms or short phrases that identify the principal subjects covered in the report, and are sufficiently specific and precise to be used as index entries for cataloging, conforming to standard terminology. (Ref. MIL-STD 847A.) The reference librarian at the CDEC Technical Information Center can offer assistance in providing proper key words.

(3) Item 20 - Abstract. The abstract should be a brief (not to exceed 200 words) factual summary of the most significant information contained in the report. If possible, the abstract of a classified report should be unclassified and the abstract to an unclassified report should consist of publicly releasable information. If the report contains a significant bibliography or literature survey mention it here. (Ref. MIL-STD 847A.)

d. An example completed DD Form 1473 is presented as Figure A-7-4.

5. FOREWORD.

a. A foreword is usually included in CDEC test reports but is optional in test plans.

b. The foreword states the authority for the test, shows the relationship of the work reported to associated efforts, and acknowledges significant assistance received. Contractual Support (the SSL) is usually acknowledged in the manner illustrated in Paragraph 3. of Figure A-7-5, Example Foreword.

6. CONTENTS PAGE. The contents page(s) is prepared by the DCSEX Reports Division as the final step before printing. Contents pages for test documents are made up in the same fashion as for this manual.

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CDEC-TR-80-002	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) NTC 1A - Stage I Letter Report Volume I - Executive Summary		5. TYPE OF REPORT & PERIOD COVERED FINAL 9 Jan - 31 Mar 80 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) US Army Combat Developments Experimentation Command and BDM Scientific Support Laboratories Fort Ord, CA 93941		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Combat Development Experimentation Command ATTN: ATEC-EX-D Fort Ord, CA 93941		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS TRADOC TRMS No. FC 096
11. CONTROLLING OFFICE NAME AND ADDRESS Commander Combined Arms Training Development Activity ATTN: ATZL-TDA-AD Fort Leavenworth, KS 66027		12. REPORT DATE May 1980 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) Commander US Army Training and Doctrine Command Fort Monroe, VA 23651		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A

16. DISTRIBUTION STATEMENT (of this Report)
Distribution limited to US Government Agencies only; Test and Evaluation, May 1980. Other requests for this document must be referred to Cdr, TRADOC, ATTN: ATCS-D, Fort Monroe, VA 23651.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES
This report is published in three volumes: Volume I is an Executive Summary; the basic text is published as Volume II; and all appendixes are published as Volume III.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Ground Combat Simulation; Field Instrumentation Systems; Tactical Engagement Simulation Training; Exercise Management and Control; Training Analysis and Feedback; Training Instrumentation; Simulation Methodology; National Training Center.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
This report presents the findings at NTC 1A, Stage I and documents the methodology and approach used during the conduct of this test. The data from Stage I will be used by CATRADA/TRADOC to assist in refining the request for proposal for Phase I of the NTC and in implementation and continued development to the centralized Engagement Simulation (ES) Training System at Ft Irwin, CA. Documentation and results of the functional analysis of Exercise Management and Control (EMC) and Training Analysis and Feedback (TAF) requirements for the NTC are presented. Documentation and results of an operational analysis of selected pro-

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Figure A-7-4. EXAMPLE REPORT DOCUMENTATION PAGE (DD FORM 1473)

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

Blk 20 (Cont'd)
totype subsystems of an Information Control Center (ICC) are contained as well as the documentation of a modeling process which can be employed to evaluate ICC configurations of NTC levels. Analysis results include Information System Requirements, ICC Manning Requirements, ICC Configurations, After Action Review Compilation, and areas where further analysis is indicated.

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

Figure A-7-4. (Concluded)

FOREWORD

1. **AUTHORITY.** Authority for the National Training Center Phase I Instrumented Training and Instrumental Test, Stage I (NTC 1A, Stage I) was TRADOC approval on 25 September 1979.

2. **CORRELATION.** The NTC 1A, Stage I experiment is identified as USACDEC Experiment FC 096. Data from this experiment will be used to increase the understanding of and NTC level Information Control Center (ICC), to recommend suggested ICC configurations, to assist in refining the request for proposal for Phase I of the NTC, and in implementation and continued development of the centralized Engagement Simulation (ES) Training System at Fort Irwin, California. Related studies include:

a. NTC 1A, STAGE III; National Training Center Phase I Instrumented Training and Instrumental Test, Stage III, USACDEC, Fort Ord, California, September 1980.

b. NTC 1A, Stages IV and V Observation Plan; National Training Center Phase I Instrumented Training and Instrumental Test, Stages IV and V Observation Plan, USACDEC, Fort Ord, California, September 1980.

3. **CONTRACTUAL SUPPORT.** Scientific Support Laboratory (SSL), USACDEC; BDM Scientific Support Laboratory (Department of the Army Contract Number DAAG-08-75-C-0105.

4. **ACKNOWLEDGEMENTS.**

a. Player personnel were provided by:

(1) 7th Infantry Division, Fort Ord, California.

(2) USAIS, Fort Benning, Georgia.

(3) USAADS, Fort Bliss, Texas.

(4) USAAMS, Fort Knox, Kentucky.

(5) USA Intelligence School, Fort Huachuca, Arizona.

(6) USA Aviation School, Fort Rucker, Alabama.

(7) USA Artillery School, Fort Sill, Oklahoma.

(8) 30th Engineer Battalion, Fort Belvoir, Georgia.

b. Communications Support Requirements (COMSR) data base was provided by the USA Signal School, Fort Gordon, Georgia.

Figure A-7-5. EXAMPLE FOREWORD

ANNEX 8 TO APPENDIX A

DISTRIBUTION OF CDEC TEST DOCUMENTS

1. The distribution list is always presented as the last appendix of the document.

2. Distribution to certain addressees is mandatory. These standard addresses are listed in Table A-8-1. Standard distribution within CDEC is shown in Table A-8-2.

3. Additional addressees are usually included in the distribution on a case-by-case basis depending on the subject matter and the requirements of the test proponent after consultation with the proponent agency. The responsible project officer of Experimentation Division, DCSEX will coordinate development of the distribution list and provide addresses, including attention lines, to Reports Division prior to staffing for the Commander's approval.

4. Reports Division, DCSEX is responsible for the initial distribution both within and outside CDEC. Secondary distribution to outside agencies will be made by the Defense Technical Information Center (DTIC) in accordance with AR 70-4.

Table A-8-1. MANDATORY DISTRIBUTION OF TEST DOCUMENTS OUTSIDE CDEC

	OTP	TDP	TR
USATRADOC Fort Monroe, VA 23651 ATTN: ATCD-T ATTN: ATTE-ZC ATTN: ATEN-S	 - 2 -	 1 1 1	 1 1 -
USATRADOC ATTN: ATTE-ZA Fort Hood, TX 76544	1	5	5
USAOTEA ATTN: CSTE-PON 5600 Columbia Pike Falls Church, VA	a	2[b]	5
PROPONENT AGENCY	c	2	10
Defense Technical Information Center Cammeron Station Alexandria, VA 22314	-	-	2[d]

a. HQ, TRADOC will distribute.

b. Major, Category 1, Category 2, Category 3, and Category 4 OT.

c. Coordinate requirements.

d. Reports Division will prepare copies of DTIC Form 50 (DTIC Accession Notice) with the following return addresses:

USATRADOC (ATTN: ATCS-D)

USACDEC (ATTN: ATEC-EX-D)
(ATTN: ATEC-PL-TL)

PROPONENT AGENCY

Table A-8-2. STANDARD DISTRIBUTION OF CDEC TEST DOCUMENTS WITHIN CDEC

ADDRESSEE	TDP		DTP		TR	
	DRAFT	FINAL	DRAFT	FINAL	DRAFT	FINAL
Commander	1	-	1	-	1	-
Deputy Commander	1	-	1	1	1	-
Chief of Staff	1	-	1	1	1	-
Scientific Advisor	1	1	1	1	1	1
DCS, Personnel	1	-	1	-	1	-
ATTN: Safety Officer	1	-	1	-	-	-
DCS, Plans	3	3	3	3	3	3
ATTN: Tech Info Ctr	-	2	-	2	-	2
ATTN: Threat & Security	1	-	1	-	-	-
DCS, Experimentation	1	1	1	1	1	1
ATTN: C, Ex Div	1	1	1	1	1	1
ATTN: P.O. (Concerned)	1	1	1	1	1	1
ATTN: USMC LNO	1	1	1	1	1	1
ATTN: Proj Case File	-	1	-	1	-	1
ATTN: C, Reports Div	1	12	1	12	1	12
ATTN: Proj Tm (Concerned)	5	5	5	10	5	5
Public Affairs Office	-	1	-	1	-	1
DCS, Resources Management	1	1	1	-	1	-
DCS, Logistics	1	1	1	1	1	-
Cdr, Instrumentation Cmd (Prov)	6	6	6	6	6	6
Cdr, Experimentation Spt Cmd	2	2	2	5	2	2
Scientific Spt Laboratory	10	10	10	10	10	6

ANNEX 9 TO APPENDIX A

FORMAT FOR TEST CRITIQUES

1. **GENERAL.** The primary purpose of the critique is to further the efficiency of field testing, not to focus on shortcomings of organizations. The critique should, therefore, reflect a positive attitude with the aim of providing guidance toward improvements in the conduct of future tests. An example test critique is given in Figure A-9-1. Reports Division, DCSEX will assist the project team in the preparation and typing of the critique.

2. **SECTION I.** This part of the test critique is a one-paragraph background statement which provides the following minimum information.

a. Identification of the Test. (Full name and short title.)

b. Purpose of the Test.

c. Project Team Executing the Test.

d. Dates and Location of Execution.

e. Identification of CDEC Elements Involved. (Other than DCSEX.)

3. **SECTION II.** This part contains as many comments as are necessary/appropriate. Each comment is followed by a discussion and, if required, a recommendation.

a. Comment. One general sentence describing or expressing a position on a specific situation. Specific staff element(s) concerned with the topic are identified in parentheses.

b. Recommendation. A brief statement of specific steps to eliminate the problem described. Because not all comments describe adverse conditions, recommendations are not always required and, in these cases, will be omitted.

4. **DISTRIBUTION.** Normally, only CDEC staff and support elements receive a complete copy of the test critique. Admin Division, DCSEX is responsible for reproducing and distributing the critique in accordance with distribution instructions from the DCSEX.

5. **REFERENCE.** DCSEX Policy Statement Number 44.

ANNEX 10 TO APPENDIX A

FORMAT FOR CDEC MILITARY OBSERVATIONS

1. **GENERAL.** Details of the content and formats for CDEC military observations are presented in Table A-10-1 and Figure A-10-1 respectively. Reports Division, DCSEX assists the project team in preparing the document. Staffing is accomplished in accordance with DCSEX Policy Statement Number 84.

2. **DISTRIBUTION.** Standard distribution is made to all holders of CDEC document "A Compilation of USACDEC Military Observations." The DCSEX recommends special distribution, depending upon the subject matter of the document. Reports Division, DCSEX makes both the standard distribution and special distribution as approved by the Commander.

3. **REFERENCE.** DCSEX Policy Statement Number 84.

Table A-10-1. CONTENT OF CDEC MILITARY OBSERVATIONS

1. **PURPOSE.** Briefly explain what observations are and by whom they are reported (e.g., "This report represents subjective military observations made by experienced USACDEC and FORSCOM officers and NCOs during the TEMAWS experiment") and the concepts they address.

2. **GENERAL** (Background). Briefly discuss the reasons for the experiment, when and where it was conducted, how it related to other experiments (if applicable) and by whom and how the results will be used.

3. **CONCEPT.** Briefly discuss the rationale/philosophy of the experiment, major equipment to be used/evaluated, and the objectives of the experiment as they relate to the military observations.

4. **DESIGN.** Briefly discuss the design of the experiment to include (as applicable) player personnel, terrain sites, numbers/types of trials, sub-trials and side tests, imposed limitations (for safety reasons, etc.) and any other pertinent information to clarify the experiment in the mind of the reader.

5. **MILITARY OBSERVATIONS.**

a. Each observation will be stated succinctly; one sentence should suffice. The observation will then be addressed subjectively in a brief, concise single paragraph labeled "Discussion." The observations may include such subjects as equipment performance, tactics or techniques, items which suggest a need for further experimentation, and subjective observations related to training.

b. The content of each MO document will vary with the complexity of the subject matter presented. Example formats are given in Figure A-10-1. The suggested format for complex subject matter permits the grouping of related observations into categories (e.g., Tactics, Equipment, Training, etc.) for the purpose of clarity of presentation.

TITLE OF EXPERIMENT

1. PURPOSE

2. GENERAL.

3. CONCEPT.

4. DESIGN

5. MILITARY OBSERVATIONS.

(For complex subject matter)	or	(For less complex subject matter)
a. <u>Equipment</u>.		**a. <u>Observation</u>.**
(1) Observation.		<u>Discussion</u>.
Discussion.		**b. <u>Observation</u>.**
(2) Observation.		<u>Discussion</u>
Discussion.		**c. <u>Observation</u>.**
etc.		etc.
b. <u>Tactics</u>.		
(1) Observation.		
Discussion.		
(2) Observation.		
Discussion.		
c. <u>Side Tests</u>.		
(1) Observation.		
Discussion.		
etc.		

DISTRIBUTION.

Figure A-10-1. EXAMPLE FORMAT FOR CDEC MILITARY OBSERVATIONS

APPENDIX B

BUDGET ESTIMATE

1. **GENERAL.** The budget estimate is prepared well in advance of the actual conduct of a field experiment. It is a best estimate based on the known scope of the experiment to be conducted. Costs are broken down by fiscal year. If all project costs will occur during one fiscal year, number the FY year at top of the left column and list expenses. If funds will be needed for more than one fiscal year, use the remaining columns as required. For a program over three fiscal years in duration, add the required number of columns to the format. The format of the budget estimate is shown in Figure B-1. DCS, Plans will be responsible for estimating requirements and providing input on required funding levels to the DCSRM prior to and during the project analysis phase of an experiment. Upon approval of the test design plan, the project team will assume this responsibility. The following guides will be used in preparation of the budget estimate.

2. **DIRECT EXPERIMENTATION COSTS (CDEC).**

a. TDY and Travel. The TDY budget estimate is prepared by DCS, Plans in compliance with CDEC Regulation 1-4 and the Joint Travel Regulations.

(1) CDEC Personnel. TDY and travel for CDEC personnel include the round trip costs of CDEC troops to FHL (or other installations) and individual TDY costs during the duration of the experiment. Members of ESC and IC instrumentation teams are not counted in TDY estimates for experimentation planning. Estimated cost is based on duration of TDY, times number of personnel, times the current rate of TDY. The current TDY rate may be obtained from the DCSRM.

(2) Outside CDEC Personnel. TDY and travel for outside CDEC personnel are based on duration of TDY times number of personnel times the current TDY rate plus the round-trip cost by air for each individual. If actual location of individuals is unknown, mid-point USA will be used. The current TDY rate and air fare rates may be obtained from the DCSRM.

(EXPERIMENT TITLE)

BUDGET ESTIMATE

FY ___ FY ___ FY ___

1. DIRECT EXPERIMENTATION COSTS (CDEC)
   a. TDY and Travel
      (1) CDEC Personnel
         (a) Coordination Trips
         (b) Experimentation
      (2) Outside CDEC Personnel
   b. Supplies
   c. Other
      (1) Flying Hour Costs
         (a) Direct Experimentation Flying Hours
         (b) Experimentation Support Flying Hours
      (2) Contractual Services
      (3) Special Maintenance
      (4) Transportation Costs
      (5) Engineering Construction Requirements
   d. Instrumentation
      (1) RDTE
      (2) OPA
      (3) OMA
2. TOTAL $_____

NOTE: Sample format above is a guide. Only applicable categories should be used. Any additional breakdowns may be made.

Figure B-1. BUDGET ESTIMATE FORMAT

(3) DCS, Plans has the responsibility of providing the DCSRM with the following information in order to obtain a TDY estimate.

(a) The number of personnel required for an experiment, to include CDEC personnel and personnel from other agencies.

(b) The expected duration of the experiment.

(c) The proposed experimentation site(s).

b. Supplies. The supply estimate is based on the duration and scope of the experiment. Estimated supply requirements should be developed by the project team. In order to establish an accurate fund estimate, the DCSLOG will provide assistance in determining the cost of standard items of supplies.

c. Other.

(1) Contractual Services. Contractual services should be itemized and include any items or services that will be contracted for the experiment, excluding the Scientific Support Laboratory. Examples of these services are: terrain studies, special displays, lease of trailers, and support from other agencies to include DARCOM.

(2) Flying Hour Costs. Flying hour costs are based on the number of estimated flying hours to be flown during the experiment times the flying cost currently being utilized for reimbursement. Current flying hour costs will be obtained from the DCSRM.

(3) Special Maintenance. Special maintenance relates to direct payment for maintenance when CDEC troops are engaged in experimentation at locations outside the Fort Ord/FHL complex. Special maintenance costs also include estimates of maintenance and repair parts for equipment and vehicles on loan.

(4) Transportation Costs. Transportation costs should include all anticipated shipments to FHL or other destinations.

(5) Equipment. Equipment costs will be addressed, when known. The DCSLOG will provide assistance in determining the accurate cost of standard items of equipment.

(6) Ammunition. Costs for ammunition items that are not funded by the ammunition procurement appropriation will also be included under this category. Supply Catalogs 1305/30-ML and 1340/98-ML can be used to compute ammunition expenses.

d. Instrumentation. The instrumentation expense estimate is furnished by Instrumentation Command (Prov) and is dependent on the nature and scope of a particular experiment. It should be noted that although this command has the capability of instrumenting a wide variety of experiments, special interface instrumentation and programming requirements exist for almost all experiments. This breakdown should reflect procurement costs by appropriation, operating costs, maintenance, data reduction, and other pertinent costing considerations.

APPENDIX C

DATA BANK

1. **PURPOSE.** The purpose of this appendix is to establish procedures for the documentation and timely turn-over of CDEC experimentation data designated by the storage and retrieval annex for storage in the CDEC data bank in accordance with CDEC Regulation 18-1.

2. **SCOPE.**

a. This appendix outlines procedures for the control and documentation of all CDEC experimentation data. It does not address system documentation of the computer used to create either the raw or edited data. (These requirements are addressed in the Inst Cmd (Prov) Computer Center SOP, Section 4, Appendix C.)

b. This appendix applies to the DCSEX, Inst Cmd (Prov), DCS, Plans, and the SSL.

3. **GENERAL.** Documentation procedures are required for the following:

a. As a necessary first step in making experimental data available to CDEC staff sections and outside agencies.

b. To derive criteria for the storage and retrieval of CDEC data.

c. To derive criteria for the final disposition of CDEC data.

d. To implement data documentation during an experiment on a preplanned basis.

4. **DOCUMENTATION SYSTEM.**

a. Requirements. The data bank requirements for a particular experiment should be described in general terms in an experiment's test design plan, and in detail in of the

detailed test plan. The published test report should list the categories of test data that are being retained in the CDEC Data Bank for the benefit of test report readers who may have some further use for the collected data. In addition to these documentary references to the data to be stored in the data bank, the transfer of the experiment's data to the data bank will be accompanied by a short data documentation report the contents of which are described elsewhere in this appendix. If the experiment in question was an RTCA test the data documentation report will be accompanied (or if necessary) followed by the document describing the RTCA Load Parameters (reference: USACDEC Real Time Casualty Assessment Handbook, Vol. II).

b. Procedure.

(1) Planning. The information required by the data documentation report should be compiled as soon as it becomes available during the experimentation process. Any changes to information already published should be placed in subsequently published documents or provided upon transfer of data to the data bank. A thorough understanding of the documentation requirements, prior to the actual collection of the data, will insure timely and complete data documentation. Planning for data documentation should be accomplished for all data media (i.e., manual forms, magnetic tape, punch cards, video and audio tapes, photos, film). All data collected during side tests will also be documented in accordance with the requirements of this appendix. The decision to retain or destroy exploratory trial data will be made by DCSEX on a case-by-case basis.

(2) Responsibilities.

(a) The DCSEX is responsible for the accomplishment of data documentation.

(b) The IC is responsible for insuring that system documentation is available to allow access to data stored on computer compatible medium for each experiment.

5. SYNOPSIS OF THE EXPERIMENT.

a. Requirement. The introductory paragraphs of the data documentation report will briefly document the purpose, objectives, and essential elements of analysis for the main experiment and all exploratory and side testing.

b. Content. Five paragraphs are required.

(1) Purpose. This paragraph will state why the experiment was conducted, e.g., to provide data as input to a study program, to develop methodology, or provide recommendations concerning proposed organizations, tactics, techniques, or material.

(2) Objectives. This paragraph will state what was to be accomplished by the experiment.

(3) Essential Elements of Analysis. This paragraph will give a description of the EEA as developed for each experiment.

(4) Exploratory Experimentation. This paragraph will list the titles and objectives of all exploratory experimentation along with the dates during which explorations were conducted.

(5) Test Documents. This section will list all major CDEC test documents published or to be published, along with publication dates and ACN numbers (when available). These major documents shall include the TDP, DTP, the test report, any published data packages, and any other major documents that pertain to the test data.

6. EXPERIMENTAL DESIGN.

a. Requirement. The experimental design, to include a description of trials, beginning and end date of each test phase, experimental conditions by trial number, supplemental research procedures, a listing of independent variables, and the number and sequence of trials, will be documented. Here, again, reference can be made to the test report for those requiring any extensive details.

b. Contents. Five paragraphs are required.

(1) Description of Trials. This paragraph will narrate the sequence of events making up a trial or run.

(2) Listing of Variables. All variables will be listed in the following order: independent, dependent, and extraneous. Each independent variable will be subdivided into experimental conditions, e.g., altitude-1500 feet, 300 feet contour. Each dependent variable will be described in terms of how it was measured, e.g., time to detection - stopwatch, to include units of measure.

(3) Experimental Conditions by Trial Number. This paragraph will contain tabular presentation(s) depicting those conditions present during each trial, will reference data from specific experimentation conditions with a specific magnetic tape, deck of punch cards, box of manual forms, or reel of film. The begining and ending dates of each phase of field execution should be included in this section.

(4) Supplementary Research Procedures. This paragraph will give the title and objectives of any computer simulations or other methods designed for research beyond the scope of field experimentation.

7. DATA FLOW PROGRAM.

a. Requirement. A diagram illustrating the flow of data from collection site to analysis and storage will be prepared. This illustration will provide the status of data collection and reduction to reflect all changes in programming up to the completion of the experiment.

b. Contents. The diagram will be illustrated with standard programming symbols for each media type. In addition, each media symbol will be labeled according to the type of data contained on the particular media.

8. INVENTORY DOCUMENT.

a. Requirement. An inventory list of all data designated for storage in the CDEC Data Bank will be prepared.

b. Contents. This requirement will be completed in two segments.

(1) Data Preparation. Data to be submitted to the data bank will be placed on a computer compatible medium if doing so will not cause a loss of information (e.g., film, pictures). Although magnetic tape is considered the primary storage medium, computer punch cards may be appropriate on occasion and identification procedures are indicated below. Also, since raw data is to be stored for one year IAW CDEC Reg 18-1, identification procedures for other data forms are given as well. All data media will be marked with the highest classification of data contained to include classification authority and declassification instructions.

(a) Magnetic Tape. All magnetic tapes will have imprinted or attached to the tape reel the following: reel serial number, short experiment title, experiment number, computer used, date of creation, system tape created under, data density, and list of trials or type of data included. In addition, the preceding indentification will be encoded on the header record of each type designated by the storage and retrieval plan for storage in the data bank. In the event that external ID is lost, the tape may be identified by passing it through the computer.

(b) Computer Punch Cards. Punched card containers will have identification to include card column, formats, data of program type, short experiment title, experiment number, date of creation, list of trials involved, and language used.

(c) Computer Printouts. The top and last sheet of a printout bundle will have identification to include the card type or magnetic tape reel number used to generate the printout, the short experiment title, the experiment number, the program used to produce the printout, creation date, and a list of trials of data included.

(d) Other Data Collection Media. All other media, to include field collection forms, oscillograph rolls, photographs, slides, notebooks, written briefings, voice or video tapes, summary analysis forms, spread sheets, overlays, and scenarios will have identification to include an assigned identification number, short experiment title, experiment number. When items are attached, identification is only needed on the top sheet. Subsequent items require only an assigned number.

(2) Inventory. Data collection media will be listed in an appendix to the data documentation report, if feasible, or in a separate document. Categories of data media will be: magnetic tape, computer punch cards, printouts, other collection media. Under each heading will be given the identification and the volume of each item. The security classification will be indicated by each type data.

9. DATA MEDIA MATRIX.

a. Requirement. Experimental variables cross-referenced with data collection media will be documented in the data documentation report. This cross-referencing may be included in the material in paragraph 6(2) and (3) or may require a separate appendix to the report.

b. Contents. This documentation will contain three segments.

(1) Variables. All variables should be listed in a matrix form similar to the example in Figure C-1. The variables will be listed in the following order: independent, dependent, extraneous. Units of measure will be written in where applicable. Trial numbers and times will be included.

(2) Media. All data collection media will be listed in matrix form similar to the example in Figure C-1. The media will be listed in the following order: manual form, card types, magnetic tape, photographs, film, other media.

(3) Cross-Reference. An 'X' will be placed in a square if data for a variable can be found on that medium, e.g., time on a detection card. Data for some variables may be recorded on several different media.

SHORT EXPERIMENT TITLE: VISCOM ACQUISITION PHASE I
EXPERIMENT NUMBER:

Variables and Data Points	DATA COLLECTION MEDIA												
	MANUAL FORM #1	MANUAL FORM #2	MANUAL FORM #3	FLIGHT DATA CARD	HPM POSITION CARD	INVIEW/OUTVIEW CARD	ENEMY THREAT CARDS	DETECTION CARDS	NEAR MISS CARDS	MAGNETIC TAPE	PHOTOGRAPHS	FILE	OTHER MEDIA
TRIAL NUMBER(S)	X	X	X	X	X	X	X	X	X	X			
DATE TIME GROUP	X	X	X	X	X	X	X	X	X	X			
AIRCRAFT TYPE	X	X		X		X		X		X			
AIRCRAFT SPEED (KTS)	X	X		X		X		X		X			
TERRAIN				X		X		X		X			
FLIGHT PLAN	X			X						X	X	X	X
EVASIVE ACTION			X			X		X	X	X			
TARGET DETECTED						X	X	X	X	X			
TIME OF DETECTION						X	X	X	X	X			
RANGE OF DETECTION (Meters)													
TEMPERATURE (^{O}F)			X							X			
VISIBILITY			X							X			
WIND DIRECTION (MILS)			X							X			
AIRCRAFT ALTITUDE (Meters)													

Figure C-1. DATA COLLECTION MEDIA (EXAMPLE)

10. MAGNETIC TAPE DOCUMENTATION.

a. General. This requirement pertains to magnetic tape containing edited Level 3 data. It does not pertain to real time data collection media. Documentation for real time data media should be available with IC as a part of real time programming documentation and is not meant to be a part of this requirement.

b. Requirement. An appendix to the data documentation report describing magnetic tape characteristics, tape format, and tape output will be prepared.

c. Contents. This document will be completed in three sections.

(1) Characteristics. This section will be completed in two segments:

(a) Magnetic Tape. A copy of Figure C-2 will be completed for each tape designated by the storage and retrieval annex of the experimentation plan for storage in the data bank. If all tapes have the same characteristics, only one copy is required but the identification numbers of all tapes sharing these characteristics must be listed.

(b) Retrieval Program. Any retrieval programs developed to printout data from magnetic tapes or punch cards will be identified in Section 3 of Figure C-2. If these programs are designated for storage in the data bank, they will be documented according to the IC Computer Division SOP, Section 4, Appendix C.

(2) Magnetic Tape File Format. This section will describe how units of information are arranged on each magnetic file tape. Any illustrations or record layout forms that will add to clarity will be included. Figure C-3 is an example of a tape format description. Any details that will add to the discussion will be included. Of extreme importance is how each data point is recorded on the tape. In most cases, a sample of the summary output will not show how the raw data is stored on the tape because of the manipulation of the data by the program. Figure C-4 gives an example of tape input and tape data layout.

1.	Historical Record.	
	a. Tape reel serial number(s)	0068-0057
	b. Experiment title and number	31.1
	c. DMRCA assigned number	N/A
	d. Date that data was encoded on tape	12 June 1967
	e. Tape location (in pencil)	N/A
	f. Security classification of tape(s)	UNCLASSIFIED
2.	Physical Description.	
	a. Number of tracks	7
	b. Tape density in bits per inch	800
	c. Name and location of computer	GE 05 FHL
	d. Any known parity errors	None
	e. Do we have a character set?	N/A
	f. Location of character set?	N/A
3.	Retrieval Program Characteristics (If Applicable).	
	a. Is there a retrieval program?	YES
	b. Title of program	31.1 PILOT RETRIEVAL PROGRAM
	c. Location of retrieval program (in pencil)	
	d. Name and company of developer	SSL - Robert Kelly
	e. Location of user's Handbook (in pencil)	N/A
	f. Security classification of program	UNCLASSIFIED
	g. Language the program is written in	FORTRAN IV
	h. Computer memory size	32K
	i. Computer compiler form	Disc
	j. Requirement for off-line storage	None
	k. Form of input	
	(1) Operating instruction	Card
	(2) Data	Tape
	l. Form of output	Card, Printout, Tape
	m. Scope of programs action	This program is designed to assemble any subset of a full data set in any arbitrary order, choosing values by logical questioning.
	n. Comments	None

Figure C-2. MAGNETIC TAPE DOCUMENTATION (EXAMPLE)

EXPERIMENT TITLE:
EXPERIMENT NUMBER:
TAPE REEL:

1. File Layout

There are 10 files on tape #0057-0068 with 1 end of file mark (EOF) separating each file and 2 end of file marks (EOF) used to terminate the file string.

2. Physical Record Layout

All physical records contain 40 words. There is no variation in word length within a record. There are 4 physical records in each file.

3. Logical Record Layout

All logical records contain 80 characters. There is no variation in character length within a reocrd. There are 3 logical records in each physical record.

4. Field Layout

There are 4 fields in each logical record, there are 4 types of fields using FORTRAN IV format:

E5 - expontential form with 5 character positions

F5.3 - decimal notation in the hundreds position

I 10 - a 10 digit integer

60A1 - 60 one-character sub-fields

Figure C-3. MAGNETIC TAPE DOCUEMNTATION (EXAMPLE)

SHORT EXPERIMENT TITLE: ATTACK HELICOPTER
EXPERIMENT NUMBER: 42.8
TAPE SERIAL #:

Layout	Source of Tape Data Items
Julian Date	
First Trial Trial Identification Roll Call Assignment Form	Manual Form
Second Trial Trial Identification Form Roll Call Assignment Form	
Nth Trial Trial Identification Form Roll Call Assignment Form	
Meteorological Data Forms And Upper Atmosphere Data Forms (in chronological order first to last on experimentation day)	
MANUAL DATA TAPE	

Figure C-4. TAPE DATA LAYOUT (EXAMPLE)

(a) File Layout. This paragraph will discuss the largest unit of data on the tape to include:

1. Number of files.

2. Length of files.

(b) Physical Record Layout. This paragraph will discuss the subdivision of files into physical records to include:

1. Number of physical records within each file.

2. Word length within each record.

3. Are records blocked or unblocked.

4. Number of words in each record.

(c) Logical Record Layout. This paragraph will discuss the subdivision of physical records into logical record.

1. Number of logical records in a physical record.

2. Character length within each logical record.

3. Number of characters in a record.

(d) Field Layout. This paragraph will discuss the subdivision of logical records into fields to include:

1. Number of fields in a logical record.

2. Field length within each logical record.

3. Description of the fields that vary in length and characteristics.

(3) Magnetic Tape Output. Each magnetic tape will have a sample of output, e.g., a printout. This section will describe the alpha-numeric characters found on magnetic tape printout as follows:

(a) Card Image Data. If data is in 80 columns or less and separated into discrete groups, a card column listing similar to Figure C-5 will be prepared for each different line of data. All abbreviations, codes, characters, and symbols will be explained in the remarks section. Decimal positions and units of measure will also be noted in the remarks section.

(b) Continuous Data. If data is not grouped in 80 columns or less but in continuous lines, a listing similar to Figure C-6 will be prepared to include a description, a typical line, a character explanation, and character positions.

(c) Item Explanation. A third alternative is to provide a copy of a printout and proceed down it describing the coding, decimal positions, and units of measure for each item on the printout.

11. COMPUTER PUNCH CARD DOCUMENTATION.

a. Requirement. An appendix will be prepared describing computer punch card coding and output.

b. Contents. This document will be completed in two paragraphs.

(1) Card Column Listing. A copy of Figure C-7 will be completed for each group of similar punch cards. An explanation of all coding, decimal locations, and units of measure will be included in the remarks section. A cover sheet will be attached to the card column listing outlining any variation in format within card containers.

(2) Card Output. Any printouts of punch card data will be documented according to the procedure outlined for magnetic tape printout.

SHORT EXPERIMENT TITLE: VISCOM
EXPERIMENT NUMBER:
CARD TYPE:
PROGRAM TITLE:
BOX #: 1 of 20

COLUMN	ITEM	REMARKS
1	Experiment	1 = VISCOM
2	Phase	1 = ACQ PERIOD 1
3	Type Card	2 = Flight Path
4	Terrain Type	1 = Mountain 1 = Rolling
5	Aircraft Type	1 = OV-1 2 = UH-1S
6	Altitude	1 = NOF 2 = Contour 3 = 200' 4 = 300' 5 = 600' 6 = 1500'
7	Speed	1 = 50-100 knots 2 = 180-220 knots
8-21	Path Segments	
22-24	Flight Number	
76-80	Z Coordinate of Aircraft	

Figure C-5. CARD FORMAT DOCUMENTATION (EXAMPLE)

SHORT EXPERIMENT TITLE: IRUS PHASE 1
EXPERIMENT NUMBER:
PRINTOUT IDENTIFICATION:
TAPE REEL NUMBER:

1. Description: The IRUS Phase 1 live fire data is contained on magnetic tapes 0068 - 0057 through 0068 - 0066. It is written in CDC 1604, BCD (Magnetic Tape and Internal) Code.

2. Typical Line: An extract from a typical line of one of these tapes may read.

F07/F-7/H11 A11071.L09 L09 BIO FIO

F07	means simulator 07 was commanded to stop firing.
/F-7	means simulator 07 fired.
H11	means target 11 was hit.
A11	means there was an A zone near-miss on target 11.

3. Character Explanation: The complete code for interpreting the alpha-numberic characters is as follows:

R = target command to raise	/R = target raised
L = target commander to lower	/L = target lowered
F = simulator commanded to fire	/ F = simulator fired
E = end fire of simulator command	
H = hit on target	

4. Character Positions. Discrete data string breakdown would consist of four characters positions.

Position 1	- Response character (x, x,/)
Position 2	- Alpha-numeric character (A, B, E, . . .)
Position 3, 4	- Target identification number (01, 21, . . .)

Figure C-6. CONTINUOUS DATA FORMAT (EXAMPLE)

SHORT EXPERIMENT TITLE: VISCOM
EXPERIMENT NUMBER:

1. Computer Punch Cards - 50 boxes

Calibration Summary Cards	- 20 boxes
Radar Reader Cards	- 10 boxes
Radar Polynomial Coefficient Cards	- 15 boxes
AMDI Round Cards	- 5 boxes

2. Magnetic Tape 3 reels

Reel	0068 - 0057	1 of 3
	0058 - 0010	2 of 3
	0069 - 0057	3 of 3

3. Printouts 3 printouts

Calibration Summary Printout	- 30 sheets
Radar Reader Card Printout	- 30 sheets
Trials 1-100 Printout	- 20 sheets

4. Other Media - Manual Forms - 900 sheets

Flight Data Form	- 300 sheets
Weapon and Position Form	- 300 sheets
Enemy Threat Form	- 300 sheets

Figure C-7. DATA MEDIA DOCUMENTATION (EXAMPLE)

12. OTHER MEDIA DOCUMENTATION.

a. Requirement. An appendix to the data documentation report will describe, for all other collection media, the items within each medium in enough detail to allow manual storage and retrieval. All categories of media from the inventory sheet, except magnetic tape, punch cards, and printout, will be described in this section.

b. Contents. This appendix will contain in three columns:

(1) Listing. Each category of media, e.g., manual forms, photographs, films, will correspond to the inventory sheet.

(2) Identification. The identification of each item will be listed in the second column.

(3) Remarks. The contents of each item will be described in the third column.

13. DATA REVIEW.

a. Data bank representatives will review and rule on the acceptability of both the data documentation report and the assembled experimentation data in regards to completeness, clarity, useability, and, in the case of the data, retrievability. The DCSEX responsibility is not fully discharged until official acceptance of these data by the data bank.

b. Ten years after the publication of an experiment's test report, its data bank stored data will be subjected to a major review. These data will be examined as regards to their current value to CDEC, the test community, and the US Army. The current condition, and retrievability of the data will also be an evaluation factor, as will the number and frequency of requests that have been received by the data bank for these data. The result of this review will be a decision to:

- **Retain in full.**
- **Retain some data and destroy other data.**
- **Destroy all data from this experiment.**

Representatives of all DCS's, of IC, and of the SSL will participate in this review.

APPENDIX D

DOCUMENTARY FILMS AND VIDEO TAPES

1. **PURPOSE.** The purpose of this appendix is to present the current CDEC policy on documentary films and video tapes produced as part of the normal end product of a CDEC experiment.

2. **GENERAL.**

a. CDEC documentary film reports are intended to be pictorial records of the conduct of experiments. They are audio-visual representations depicting how a given experiment was conducted and/or what were the test results.

b. The documentary film report is the responsibility of the Project Team Chief. The Project Team Chief will act as overall director of the film report. Advice and assistance in the production of the film will be provided by the IC Motion Picture Production (MOPIC) Specialist (DA civilian) assigned to the specific film report. Film crews and other necessary cinematography support will be provided by IC Pictorial Branch. The MOPIC Specialist will function under operational control of the Project Team Chief so far as the specific film report is concerned. The Project Team Chief will submit a short letter report through IC to Chief, Pictorial Branch, rating the performance of the MOPIC Specialist in particular and Pictorial Branch motion picture support in general. This letter report is due within 10 days of final command approval of the film.

c. The MOPIC Plan contains a list of scenes or actions which must be filmed during the course of the experiment in order to cover all aspects of the experiment. It consists of a description of each scene to include any special information or requirements. It is not necessary to determine how long each scene will be, the narration describing each scene or how each scene will be meshed with other scenes. Those details will be addressed in the script. To prepare the MOPIC plan, the writer must know the story to be told in the film and have knowledge of the experiment phases and events. The MOPIC

plan is then used by the MOPIC Specialist to plan for and schedule motion pictures crews and facilities.

d. The script contains a detailed description of each scene in the film accompanied by cinematographic directions and the narrative to be recorded in conjunction with each scene. All titles, graphics, and animation are included as well as directions regarding sound effects and music to be included on the sound track. To prepare the script the script writer must know the story to be told in the film and all scenes being, or to be shot. The script writer then ties it all together into a smooth flowing sequence of visually and verbally presented material which fits into the required time limit. A "storyboard" may also be prepared which contains a sketch of each scene to accompany the description and narrative already described. The storyboard simplifies the visualization of the script for those responsible for various aspects of the production as well as those not directly involved but requiring an overall picture for information. The script can be developed only when the contents of the film, i.e., the MOPIC Plan, have been approved. The script writer may want to view processed film as it is approved to aid him in preparing the script. The script will be prepared by the Scientific Support Laboratory Contractor with the tasking order being prepared and submitted by the Project Team Chief. This tasking order must specify a delivery date for the final script of not later than the last day of record trials. A copy of the MOPIC plan previously prepared by the Project Team Chief and MOPIC Specialist will be attached to the tasking order as reference material for the script writer. The script writing may be contracted out in accordance with DF ATEC-RM-M, "Scriptwriting for Documentary Film Making" dated 31 May 1979. A copy of the finished script will be submitted to the Commander for approval.

e. Film report production will be accomplished in accordance with the schedule depicted in Figure D-1.

2. SPECIFIC RESPONSIBILITIES.

a. Although the documentary film report is the overall responsibility of the Project Team Chief, his primary assistant for the cinematographic production is the

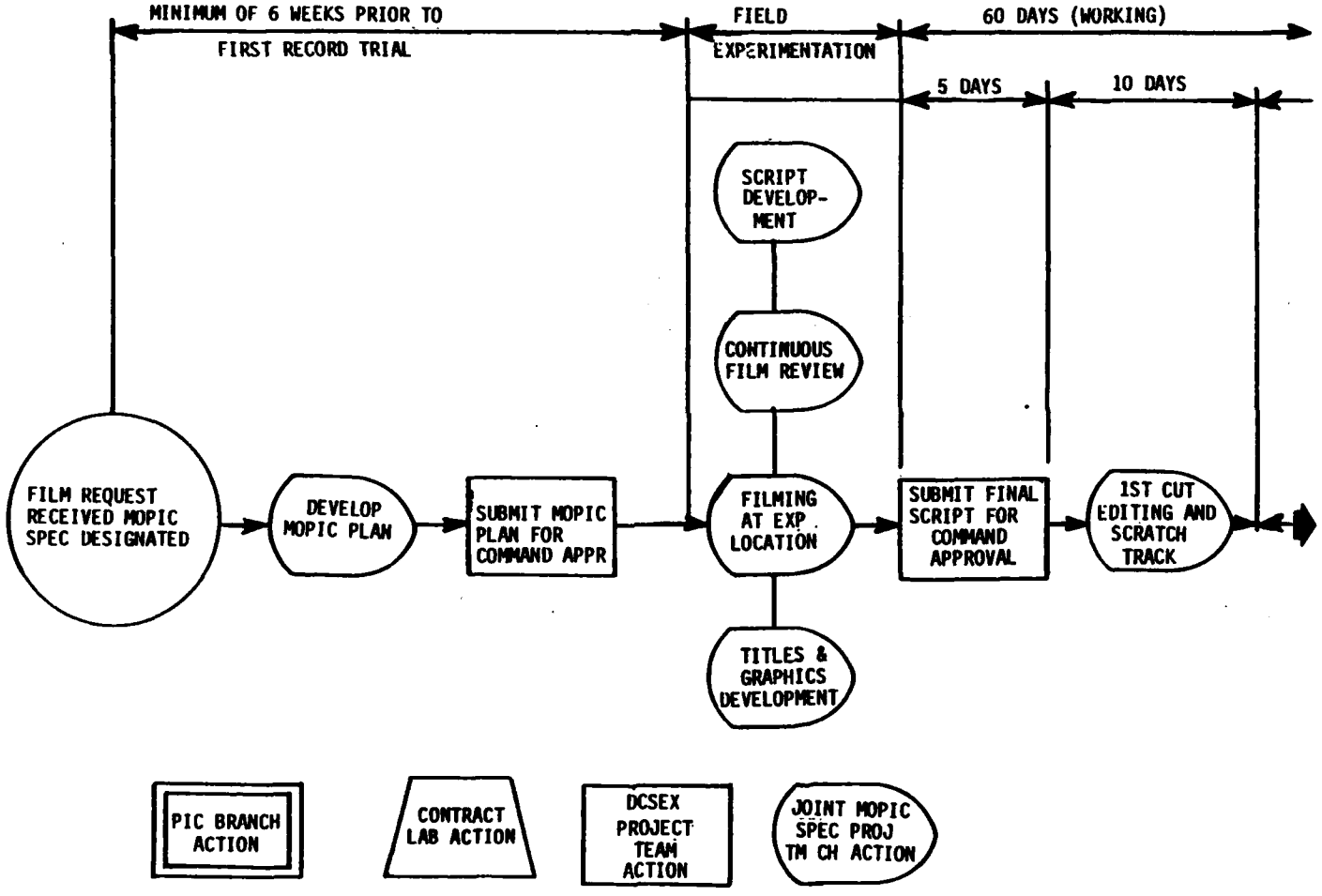


Figure D-1. FILM REPORT PRODUCTION SCHEDULE

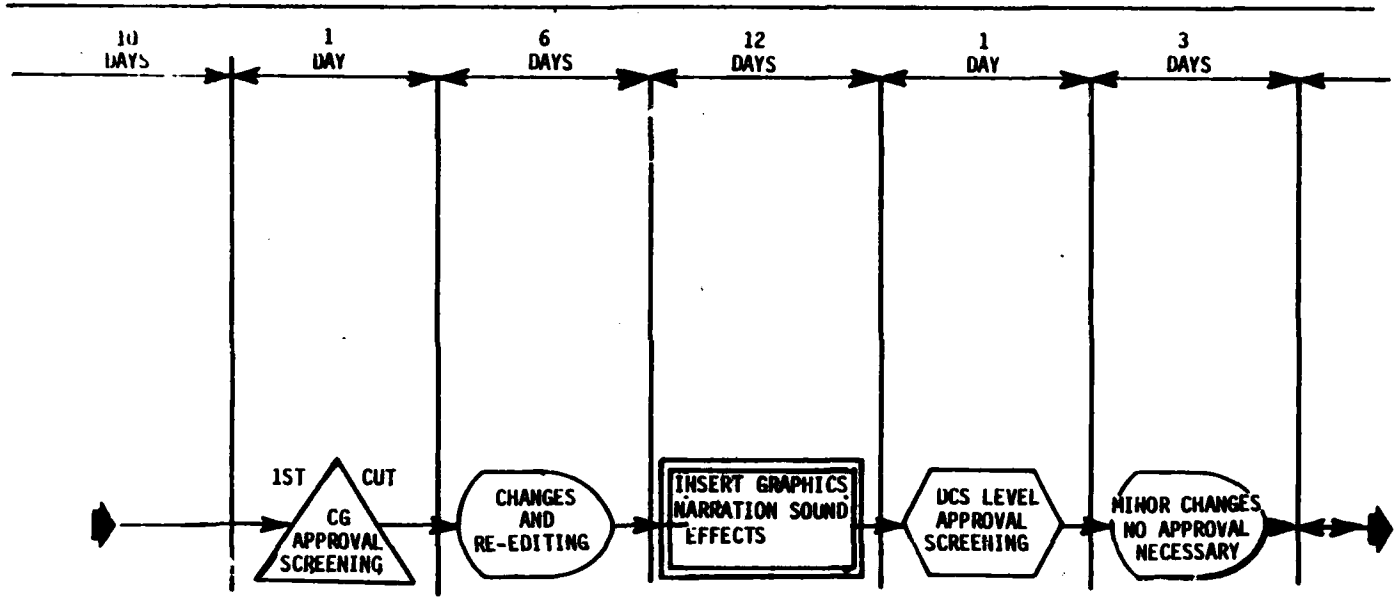


Figure D-1. FILM REPORT PRODUCTION SCHEDULE (Continued)

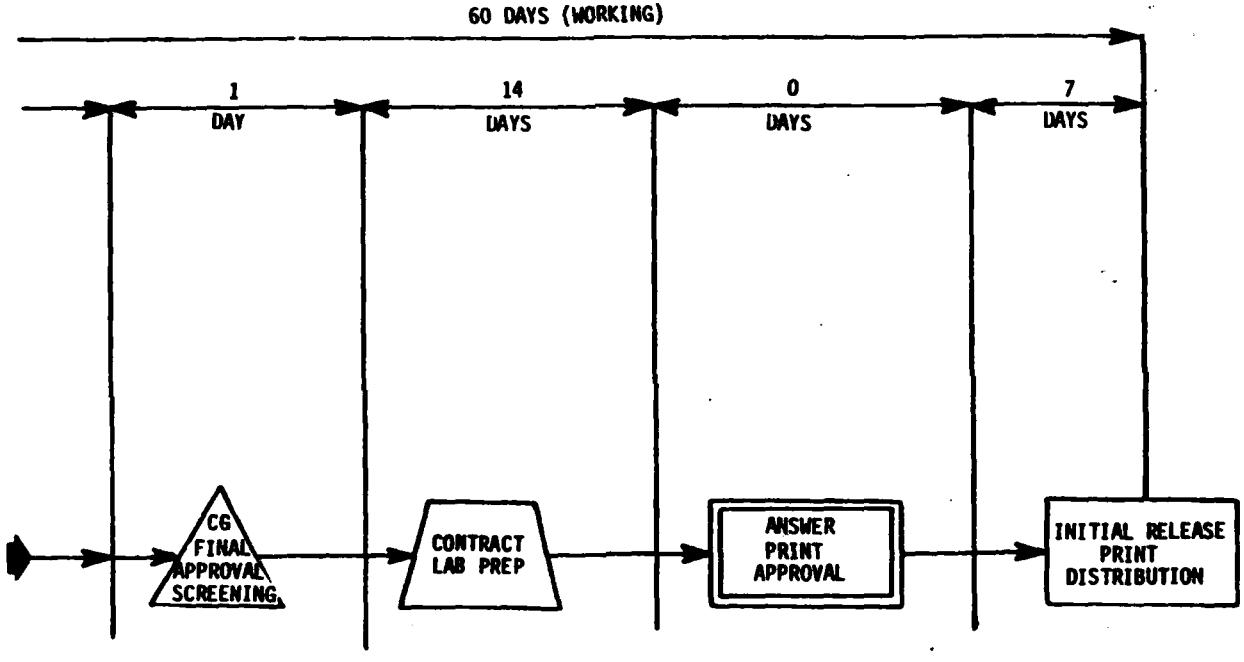


Figure D-1. FILM REPORT PRODUCTION SCHEDULE (Concluded)

MOPIC Specialist assigned to the documentary film report by Chief, Pictorial Branch, IC. The responsibilities of the two are as follows:

b. The Project Team Chief and MOPIC Specialist will jointly prepare the outline plan for motion picture coverage (MOPIC Plan) and submit it to the DCSEX who will submit it for Command approval prior to beginning of field photography. During field experimentation the Project Team Chief and MOPIC Specialist will jointly revise the MOPIC plan as necessary. During field photography the Project Team Chief will provide coordination and assistance to the MOPIC Specialist for his cinematographic activities conducted during the field portion of an experiment.

c. The Project Team Chief will:

(1) Insure that the MOPIC Production Specialist is provided the use of troops, vehicles, aviation or watercraft necessary to meet filming requirements. This includes assistance in arranging staged scenes when necessary to preclude interfering in actual experimentation.

(2) Insure that unusual or special equipment is made available for photographic coverage as required.

(3) Insure that support participation of other Army commands, other services, or other agencies is coordinated when necessary.

(4) Insure that logistical support, including transportation, is provided for the film crew as required.

(5) Follow the progress of production through final command approval, development, filming, and technical advice on content.

(6) Coordinate through DCSEX, the script writer task assignment to the SSL or other designated contract support.

d. The Motion Picture Production (MOPIC) Specialist is responsible to the project team for:

(1) Assisting in the development of the MOPIC Plan for submission to DCSEX prior to beginning field photography.

(2) Scheduling necessary film crews, sound recording work and viewing facilities. All approval screenings will be conducted at the Pictorial Branch Motion Picture Facility at Fort Hunter Liggett. In those cases where conflicts arise due to simultaneous requirements of two or more films the DCSEX will resolve them.

(3) Supervising shipment of exposed film to the contract laboratory and notifying the Project Team Chief when processed film has been received. All processed film will be viewed by the MOPIC Specialist and the project team representative within 24 hours of receipt to determine if it is satisfactory or if scenes must be refilmed.

(4) Developing, from guidance provided by the Project Team Chief, the necessary graphics and titles. The MOPIC Production Specialist will submit the necessary work orders and effect the necessary coordination with the TASC, Fort Ord.

(5) Supervision of film shooting, sound recording and graphics/animation photography.

(6) Assisting in the development of the final script for submission no later than the last day of field experimentation.

(7) Editing the exposed film to best represent the action required by the approved script.

(8) Reviewing the print for photographic quality.

(9) Keeping the Chief Pictorial Branch, advised on current status of film production and performance of Pictorial Branch film crews and audio section personnel.

e. IC will be responsible for post experimentation production of the film.

3. **BASIC FILM PRODUCTION GUIDANCE.**

a. As a minimum, the content of the documentary film report will include:

(1) The purpose and objectives of the experiment.

(2) Major items of player equipment.

(3) Major instrumentation devices.

(4) A pictorial record of a representative trial or side test for each significant phase of the experiment.

(5) Results of experiments will normally not be included.

b. Staged scenes should be avoided unless the nature of the experiment prevents the filming of actual trials. This will insure that the film is presented realistically and will allow no room for a challenge of the films' objectivity. Stock footage, such as a view of the entrance to an Army post, may be used.

c. Documentary Film Reports will not contain material which:

(1) Contravenes the provisions of Title 18, the United States Code, as discussed in AR 108-5, Army Photography and Film Distribution.

(2) Depicts soldiers in unauthorized or incomplete uniforms or performing obscene, embarrassing, or disrespectful acts.

(3) Descredits, or is unfavorable to the Army, or other uniformed services, or agencies of the federal government.

(4) Implies indorsement of a commercial product or service by the introduction of trademarks, labels, distinctive packaging, or references to trade or brand names in the narration, dialogue, or titles.

4. **DISTRIBUTION AND STORAGE.**

a. Initial distribution of CDEC documentary film reports is the responsibility of DCSEX in accordance with CDEC Command Policy 18-1 dtd 2 Aug 78. Subsequent requests for documentary film reports will be processed through Security Branch, DCSPL, IAW Command Policy 18-1 dtd 2 Aug 78 to IC, ATTN: ATEC-IC-OPB.

b. CDEC documentary film report original film (master) will be maintained by Pictorial Branch, IC, and will be used only for professional laboratory duplication.

c. A minimum of one copy of each film report will be retained in the CDEC film library. Chief, Pictorial Branch, IC, is responsible for maintaining the film library and for publication of the CDEC Documentary Film Report Index. Films may be obtained on loan in accordance with instructions to be provided in that Index.

5. **VIDEO TAPE PRODUCTION.** As a supplement to, or a substitute for, an experiment's documentary film, the Project Team Chief may choose to produce a documentary video tape cassette. To the extent that this is a major or a total substitution for the experiment's documentary film, then the same Command approval must be obtained for an outline plan of video coverage as required for a documentary film. The Team Chief and the MOPIC Specialist will have responsibilities similar to those they would have in the case of the film documentary. Technical details and production schedules may be subject to slight adaptations due to the technical differences between the film and the video media.

APPENDIX E

USE OF HUMAN VOLUNTEERS

1. **PLANS.** During the planning stage, DCS, Plans will provide an experimentation concept to the Human Factors Branch, DCSEX, for review to determine if the provisions of AR 70-25 apply with regard to use of human volunteers.

2. **CONSIDERATIONS.**

a. If the provisions of AR 70-25 are determined to be applicable, the DCS, Plans will hold a special ETG meeting with the following representatives:

(1) Human Factors Officer.
(2) DCS, Plans Project Officer.
(3) DCS, Experimentation.
(4) Staff Judge Advocate.
(5) Safety Officer.

b. This group will consider the following factors:

(1) Risks to life/injury.
(2) Steps to minimize risks.
(3) Justification of the expected risk to life/injury.

3. **ACTION.**

a. Based on this assessment, DCS, Plans, with the assistance of the Human Factors Branch, will make appropriate written recommendations to the Commander to have the TRADOC Surgeon review the test plan to determine whether human volunteers are required. If the use of human volunteers is required, approval of the Surgeon General will be requested as required by AR 70-25. If additional actions related to human volunteers

are required after responsibility for the experiment has shifted to DCSEX, the DCSEX will take appropriate action.

b. When appropriate, as directed by the DCS, Plans, enlisted personnel will be represented at a special ETG meeting by a senior NCO and a junior (E-2 - E-5) enlisted member to insure that all areas of concern to volunteers are addressed.

APPENDIX F

GLOSSARY

The following terms have been defined according to one or more of their usual application at CDEC. Many have meanings different from those attibuted to them in normal discourse (e.g., bias), while others have specific meanings with respect to military usage (e.g., parameters). Terms presented herein may be used in other contexts if their usage will not mislead the reader.

ACCURACY.

1. Degree to which a measure of an object or event conforms to the true value of the object or event or to a standard; e.g., accuracy of range determination.

2. (Statistics.) See BIAS.

ACTION CONTROL NUMBER (ACN). A number identifying a separate combat developments action (concept, doctrine, derivative study, proposed or approved Required Operational Capability (ROC), FM, TOE, field experiment, troop test, war game, special project, or any other identifiable single combat developments action) assigned by the TRADOC Data Processing Field Office (DPFO), Fort Leavenworth, KS.

AGGRESSOR FORCES. In the context of training exercises and field experimentation, the "enemy" created to add realism. Aggressor forces may be represented by live troops in the field or by mechanical targets with or without other simulator devices.

AIMING ERROR. The deviation of the actual aim point from the desired aim point.

ANALYTIC MODEL. See MODEL.

ANGLE OF INCIDENCE. (AR 310-25.) The angle between the normal to the surface of impact at the point of impact and the line of impact arrival.

AVERAGE. A quantity equal to the summation of all the observed values divided by the total number of observations. Synonym: Arithmetic Average.

BALLISTIC DISPERSION. The dispersion (or scatter) in trajectories or impact points attributable to the physical characteristics of a weapon, its ammunition, and the environment. Dispersion results from dimensional tolerances, jump, obscuration, inconsistency of projectile and propellant charge weights, primer action, temperature, and instability in flight. It does not include that part of the total dispersion attributable to human operator and crew performance such as aiming errors. Ballistic dispersion may be described as a standard deviation, probable error, or circular error probable (q.v.).

BIAS. Any factor in an experimental or operational that systematically introduces a persistent error; a tendency to err in a certain direction.

BIVARIATE. Of, relating to, or involving two variables.

CARD IMAGE DATA. Data on a printout corresponding to the 80 columns on a punch card.

CARD COLUMN LISTING. A method for identifying data contained in the 80 columns of a punch card.

CASUALTY ASSESSMENT. In field experimentation, the process of assessing simulated casualties or damage by the use of empirical criteria or by estimates. Such estimates may be made on pretrial, real time, or posttrial bases, or some combination of these.

CASUALTY CRITERIA. Casualty criteria are used to specify weapon effectiveness against personnel targets. They are expressed in terms of degradation in an individual's capacity to perform his military functions in a particular type of tactical situation within a given period of time. For example, a 50 percent, 30 second, assault criterion would refer to a 50 percent reduction within 30 seconds of an individual soldier's ability to perform his functions in the assault. A probability of .75 at 350 meters for a particular weapon against this criterion would mean that a wound inflicted by that weapon at 350

meters would have a 75 percent chance of producing that effect. Thus, the interpretation of "kill" or incapacitation probabilities depends on the criteria specified by the agency developing the data and should be ascertained before such data are used for any purpose.

CENTRAL TENDENCY. A term used to describe the most representative value of a group of numerical values derived from the measurement of a common attribute within a population or sample. The distribution of such values need be neither normal nor symetrical. The most common measures of Central Tendency are MEAN, MEDIAN, and the MODE.

CHANCE ERROR. See RANDOM ERROR.

CIRCULAR ERROR PROBABLE (AR 310-25). An indicator of the delivery accuracy of a weapon system, used as a factor in determining probable damage to a target. It is the radius of a circle within which half of the missiles/projectiles are expected to fall. Also see DELIVERY ERROR DEVIATION, DISPERSION ERROR, and HORIZONTAL ERROR.

COMBAT DEVELOPMENT STUDY. A study directed at the determination of new or improved operational and organizational objectives and concepts, tactics, techniques, and procedures.

COMBINED TESTING. See JOINT TESTING.

CONCLUSION. A reasoned judgment based upon analyses of experiment data.

CONDITIONAL KILL PROBABILITY. The probability of killing a target, given a hit. Conditional kill probabilities are technical performance data derived as a function of target configuration, range, and other conditions related to terminal ballistics of specific ammunition and weapons.

CONFIDENCE INTERVAL. A range of numerical values determined by a procedure such that with a specific level of statistical confidence it will include the true value of a characteristic being estimated for the entire population from observations of a sample.

CONFIDENCE LEVEL. The probability that the true value of a population characteristic is included within a specified confidence interval.

CONTROL GROUP. A group of persons who are not exposed to specific levels of an independent variable but are exposed to the other conditions in the experiment in order to establish a baseline of performance against which to estimate the effects of the independent variables.

COORDINATED TEST PLAN (CTP). The formal comprehensive test program to be undergone by a given hardware item during its life cycle. It receives extensive coordination among major commands and HQ DA and is ultimately approved by OCRD. It defines specific tests to be conducted, the number of test items required for these tests, and those agencies responsible for the conduct of the tests.

CORRELATION.

1. A statistical procedure for describing the degree of relationship among variables.

2. In a nonstatistical sense, arrangement or rearrangement of data from different sources in order that they may be interpreted, further processed, or otherwise made more useful.

CORRELATION COEFFICIENT. A number within a range -1.0 to +1.0 which expresses the degree of linear relationship between variables.

COUNTERBALANCING. A method of cancelling out the influence of extraneous variables, such as time or order, that cannot be otherwise removed. In general, it may be accomplished by presenting the independent variables on different trials in such a way that the affects of the extraneous variables will be averaged out over the series of trials, thereby avoiding a systematic bias.

DAMAGE CATEGORIES. A means of classifying the extent and principal effect of physical damage. For example, damage to armored vehicles employs the following categories:

K DAMAGE - Damage that will cause the vehicle to be destroyed beyond repair.

F DAMAGE - Firepower damage causing complete or partial loss of the ability of the vehicle to fire its main armament and machine guns.

M DAMAGE - Mobility damage causing immobilization of the vehicle.

DATA (Plural of datum). The collective mass of observations used as a basis for analysis, inference, and conclusions.

RAW DATA - Observations in the form in which they were originally recorded.

REDUCED DATA - Those which have been processed from field records into forms suitable for analysis. For example, raw data in the form of polar coordinates may have to be reduced to map coordinates before they can be analyzed.

DATA DOCUMENTATION. The techniques used for the order presentation, organization, and communication of recorded data.

DATA MEDIA MATRIX. A cross reference of data for all variables with collection media.

DATA, OBSERVED.

1. Data obtained through careful observations in nonexperimental situations. Though a situation is not structured experimentally, the observation of troop behavior during the conduct of normal field operations may be useful in the identification of problem areas and the development of hypotheses for subsequent field experimentation.

2. Data obtained through careful observations in experimental situations. Such data, to include objective and subjective data, are often useful in extending, interpreting, and explaining the results or relationships among variables which are discovered or confirmed during experimentation. They serve also as a basis for the development of hypotheses for subsequent testing.

DATA, SUBJECTIVE. Data dependent upon judgment of a particular individual and reflecting his frame of reference or values. Examples of subjective data are evaluations and estimates made by individual soldiers playing roles in field experiments.

DELIVERY ERROR (AR 310-25). The inaccuracy associated with a given weapon system resulting in a dispersion of shots about the aiming point. Also see CIRCULAR ERROR PROBABLE, DEVIATION, DISPERSION, and HORIZONTAL ERROR.

DEPENDENT VARIABLE. See VARIABLE.

DETECTION. Discovery of the presence or existence of an actual or suspected target. May result from weapon flash, smoke, dust, noise or other activity, cues, or signature associated with the targets. Detection is regarded as the first step in the acquisition process.

DETERMINISTIC MODEL. See MODEL.

DEVELOPMENT TEST (DT). A test conducted by or for the contractor or developer to assist the developer in carrying out his research and hardware development to validate technical performance and to determine the degree to which new hardware meets the stated requirement of the user. This type of test is normally performed by the Army Materiel Command.

DEVIATION.

1. The difference between a value in a frequency distribution and a fixed number, such as the difference between a particular number and the average of the set of numbers under consideration.

2. A variation from a trend.

3. (AR 310-25.) The distance by which a point of impact or burst misses the target.

4. Also see CIRCULAR ERROR PROBABLE, DELIVERY ERROR, DISPERSION ERROR, and HORIZONTAL ERROR.

DISPERSION.

1. (AR 310-25.) A scattered pattern of hits, by bombs dropped under identical conditions or by projectiles fired from the same weapon or group of weapons with the same firing data.

2. (Statistics.) The extent to which a group of scores or measures differ from one another, or from some reference point such as the mean. Common measures of dispersion are range, standard deviation, probable error, circular error probable, and variance.

DISTRIBUTION. (Statistics.) An arrangement of numbers, scores, or characteristics. See PROBABILITY DISTRIBUTION and FREQUENCY DISTRIBUTION.

ENGAGEMENT. Firing of a weapon at a target or target area. It lasts from the instant the first round aimed at that target leaves the weapon until the last round has impacted or passed beyond the target.

ESSENTIAL ELEMENTS OF ANALYSIS (EEA). An EEA is a question specifically designed to obtain an answer in a particular functional area. An analogy to the EEA is the Essential Elements of Information (EEI) series of questions asked by the S2/G2, where the information obtained is used as a basis for making an intelligence estimate. The EEA perform the same function in the combat developments. The answers to the EEA provide factual information needed to develop logical conclusions and recommendations.

EVENT. See EXPERIMENTATION EVENT.

EXPECTED VALUE (Statistics). Theoretical average value of a measured quantity; the average or mean value of the measurements obtained.

EXPERIMENTATION DESIGN. Specification of statistical conditions under which measurements are to be made. The selection of an appropriate design for the experiment is a function of many considerations such as the type of objectives and EEA to be answered, the statistical confidence to be attached to the conclusions, the randomization techniques to be used, and the precision required. Properly selected experiment designs should provide the most practical means by which data can be obtained to draw valid conclusions.

EXPERIMENTATION EVENT. A specific action and/or circumstance that, by design, generates dependent variable data normally pertaining to a single cell of an experiment matrix.

EXPERIMENT GROUP. A group of persons who are exposed to an independent variable and whose performance will therefore reflect the influence of that variable. In a comparative experiment, there may be a number of experiment groups to reflect the influence of change in the independent (i.e., controlled) variable or variables. The experiment group is contrasted with the control group. See CONTROL GROUP.

EXPERIMENTATION. Controlled exercises or a definite arrangement of conditions to collect objective data on specific problem areas or organizational objectives, concepts, tactics, techniques, and procedures. The independent variable(s) are deliberately changed to observe their effects on the dependent variable(s) or phenomenan being observed.

EXPERIMENTATION CONTROL CENTER. Field control center established by a project team for the control of an experiment or of a phase of an experiment; the command post of an Experimentation Control Officer.

EXPERIMENTATION CONTROL OFFICER. Officer member of a project team appointed to control an experiment or portion of an experiment.

EXPLORATORY. Designed to orient in or acquaint with the outline or first elements of a subject; Preliminary.

EXTRANEOUS VARIABLE. See VARIABLE.

FACTOR. Any one of several conditons that may influence experimentation results.

FACTOR ANALYSES. A statistical method, based upon multiple correlation of scores obtained on a set of selected tests which may be of physical, operational, or personnel nature or planned combinations of these. Results are expressed as factors (with their associated tests) descriptive of the basic attributes that contributed to performance on the experiment set.

FIELD EVALUATION. (As defined in the FYTP.) An evaluation using TOE troop units in a normal operating field environment in either combat or noncombat operating conditions. Emphasis in these exercises is on operational reality characterized by:

a. General scheduling of activities rather than a scenario.

b. Realism taking precedence over the control necessary for generating precise data.

c. Data collection by observers, interviews, and unit documentation.

d. Data collection periods of weeks or months.

FIELD EXPERIMENT. An experiment conducted with military personnel and equipment under simulated operational conditions in a carefully controlled and instrumented environment to obtain objective, quantitative data. Field experimentation requires results of the highest validity and reliability that available time and resources permit. Field experiments are generally characterized by:

a. Strict adherence to a scenario.

b. A balance of realism and control necessary for generating high resolution precise data.

c. Highly reliable data collection procedures, usually employing instrumented recording.

d. Replication of designated events or scenarios to achieve data with statistical confidence.

e. Repetitive data collection periods of minutes or hours.

FIELD TEST. A test conducted under controlled field conditions by TOE units with primary reliance upon objective as opposed to subjective data. Field tests are characterized by:

a. Some flexibility in unit activities within a detailed scenario.

b. A balance of realism and the control necessary to generate precise data.

c. Data collection by independent observers, instrumented recordings, and interviews.

d. Data collection periods of several days.

FINDINGS. Statements derived from analysis of experiment data concerning relationship among variables.

FIVE-YEAR TEST PROGRAM (FYTP). A document published by the DCSOPS that results from the semi-annual TSARC. It contains the outline test plans (OTP) for operational tests (OT) major and designated nonmajor systems force development testing and experimentation (FDTE) and joint/combined tests identified as of the publication date, for the specified FYTP period. The FYTP provides guidance to CDEC in the conduct of experimentation.

FORCE DEVELOPMENT TESTING AND EXPERIMENTATION (FDTE). As defined in the FYTP, FDTE is that testing comprising of field tests, field evaluations and field

experiments performed by or for the user. These tests support the force development process by examining the impact, potential, or effectiveness of selected concepts, doctrine, organization, and materiel. See USER TEST.

FRACTION OF CASUALTIES. The percentage of casualties that may be expected to occur among the total number of personnel in a target area.

FREQUENCY DISTRIBUTION. A frequency distribution is the grouping of data into classes or categories according to the frequency of occurrence of each successive value or interval of values. The application of certain statistical techniques is based upon theoretical distributions (such as the normal distribution) which are specifiable in terms of functions (formal rules stated as mathematical laws governing their generation). The laws determining the distributions describe families of specified form. Also see DISTRIBUTION and PROBABILITY DISTRIBUTION.

HIT. Contact with a target by a projectile.

HIT PROBABILITY.

1. The probability of obtaining a hit on a target under specified conditions.

2. See OPERATIONAL HIT PROBABILITY and SINGLE SHOT KILL PROBABILITY.

HIT/KILL PROBABILITY. See OPERATIONAL HIT/KILL PROBABILITY.

HORIZONTAL ERROR (AR 310-25). Error in range deflection which a weapon may be expected to exceed as often as not. Horizontal error of weapons making a nearly vertical approach to the target is described in terms of circular error probable. Horizontal error of weapons producing elliptical despersion pattern is expressed in terms of probable error. Also see CIRCULAR ERROR PROBABLE, DELIVERY ERROR, DEVIATION, and DISPERSION ERROR.

HYPOTHESIS.

1. A tentative assumption made in order to draw out and test its logical or empirical consequences.

2. A statistical hypothesis is a statement about one or more characteristics of one or more population distribution.

IDENTIFICATION/DESCRIPTION.

1. The description of an installation, personnel, equipment, or activity which is observed. For example, FIFTY INFANTRY AND THREE TANKS IN THE OPEN. The description includes (as appropriate) the type, size, density, cover, mobility, and importance of the target.

2. (AR 310-25.) The indication by any act or means of your own friendly character or individuality.

IDENTIFICATION PROBABILITY.

1. The probability that, under a given set of conditions, an observer will identify a given target in a particular way. For example, an armored personnel carrier might be correctly identified as an armored personnel carrier 70 percent of the time, as a tank 25 percent of the time, and as some other target 5 percent of the time.

2. The probability that, under a given set of conditions, an observer will identify a given target within a specified period of time after the target is detected by the observer.

INDEPENDENT VARIABLE. See VARIABLE.

INHERENT ERROR. The dispersion of fire about a center of impact or center of burst attributable to imperfections of a weapon and its ammunition. It may be expressed as

probable error (as listed in firing tables for artillery weapons), circular error probable, or standard deviation. Synonyms: round-to-round dispersion; firing table error.

INTERVISIBILITY. Existence of line-of-sight relationship between two or more objects, regardless of whether one is seen by the other.

INTRASERVICE SUPPORT AGREEMENT (AR 310-25). A document wherein the participants, to an intraservice support transaction, to preclude any misunderstanding, state clearly the arrangements that have been arrived at between the two activities involved, especially the obligations assumed by each and the rights granted to each.

JOINT OR COMBINED TESTING. Testing in which the Army participates with another service. Such tests are conducted to evaluate Army systems or concepts having an interface with or requiring a test environment of another service, or systems or concepts of another service which require testing in an Army environment. The extent of Army participation in joint testing will be determined on a case-by-case basis.

KILL. The term used to denote that an object has been destroyed or otherwise rendered completely nonoperational. A human target may be "killed" in this sense without necessarily suffering death. In the case of vehicles, a "mobility kill" may not necessarily render the vehicle or crew incapable of fighting. See DAMAGE CATEGORIES.

LETHAL AREA. The sum of all areas presented by a specified target exposed to fragmentation, regardless of where located. It is expressed in square meters.

LETHAL RADIUS. The distance from a burst (considered as a point source) at which destruction or effective disabling of a target may occur. Although the word "radius" implies a circular effects pattern, the actual distribution of effective fragments is highly directional, depending upon the angle of impact, terminal velocity, fuse, projectile design, ground cover, and other factors.

LETHALITY. The capacity of a projectile to produce casualties. In the case of fragmenting munitions in an area-fire role, the usual measure of lethality is "lethal area,"

a number that when multiplied by density of targets results in an expected number of casualties.

LEVEL OF SIGNIFICANCE. The risk, expressed as a probability, that a true hypothesis might be erroneously rejected on the basis of an inference drawn from a statistical sample. Synonym: risk level.

LOCATION. A point or place designated by reference to a military grid system, survey observation post, registration point, or reference point.

MASK ANGLE. Angle from the horizontal to the top of an obstacle, which intervenes between a position and more distant region.

MEAN. The most common measure of central tendency, the arithmetic average of all the values in the sample: the expected value of a distribution.

MEASURE (Verb). To determine the magnitude, quantity, or value.

MEASURE (*Noun*).

1. A result obtained by measurement; any quantification of a variable.

2. Sometimes used to denote the instrument or situation wherein measurements are taken.

MEASURE OF CENTRAL TENDENCY. A representation of a distribution of data by a single number. See MEAN, MEDIAN, and MODE.

MEASURE OF EFFECTIVENESS (MOE). A criterion expressing the extent to which a combat system performs a task assigned to that system under a specified set of conditions. Thus, an individual MOE supplies a partial answer to the question: How well does System X perform assigned Task Y under a set of combat conditons Z?

MEASUREMENT. Any process by which a quantity is attributed to something; the assignment of numerals to things, in accordance with certain conventional rules, as to represent their magnitude.

MEDIAN. The middle datum when a set of data are arranged in order of magnitude. If there is no single middle datum, then the mean or average of the two middle data is the median. For example, 4 is the median of (1, 4, 4), (4, 4, 4), or (4, 4, 5). 4 is the median of (1, 3, 5, 9), (2, 2, 6, 8), or (1, 1, 7, 9).

MODE. The most common value or class of values in a series; the peak or peaks in the graphical representation of a frequency distribution. For example, 1 is the mode of the distribution (1, 1, 1, 2, 2, 3), 6 is the mode of the distribution (0, 3, 4, 5, 5, 6, 6, 6, 7, 7, 8, 9, 12).

MODEL.

1. A model is anything (e.g., a verbal framework, a diagram, a mathematical equation), that usefully represents an actual situation or condition. It is the result of abstracting from the actual situation.

2. A mathematical model is a representation of system characteristics designed to show quantitative relationships and interactions of selected man, machine, and environmental factors.

3. A functional model is a representation of system characteristics designed to show functional relationships among the various elements of a system. It may be mathematical, schematic, verbal, or physical.

MONTE CARLO. Any procedure that involves statistical sampling techniques to obtain a probabilistic approximation to the solution of a mathematical or physical problem.

OBJECTIVE DATA. See DATA, OBJECTIVE.

OBSERVED DATA REPORT. An interim report of observed data taken during the execution of an experiment together with descriptive statistics of the data such as measures of central tendency and variability in the observed data. The observed data report does not include the results of statistical analysis techniques and does not include inferences that might be drawn from the data at a later date as a result of hypothesis testing, analysis of variance, or other statistical techniques. The observed data report presents the observed data in an understandable tabular form together with those descriptive statistics appropriate to the observed distribution of data.

OPERATIONAL CONTROL. With reference to CDEC, operational control consists of those functions of command involving the composition of subordinate elements, the assignment of tasks, the designation of objectives, and the authoritative direction of operations necessary to accomplish the mission. It does not include such matters as administration, discipline, internal organization, and unit training. Where conflicting requirements are imposed by parent unit commanders and officers exercising operational control, as might arise in the conduct of experimentation, resolution will be effected by the Chief of Staff.

OPERATIONAL DEFINITION. The description of a weapon or system in terms of what the weapon or system does when activated. For example, a technical definition of a weapon might describe its physical characteristics such as length of barrel, cyclic rate of fire, and weight. An operational definition might describe its ability to deliver fire under varying conditions, at rates compatible with the fire mission, with certain characteristic dispersions at various ranges.

OPERATIONAL ERRORS. The bias and dispersion of fire attributable to imperfections in the functioning of a weapon system in a field environment, exclusive of inherent errors. Operational errors are caused by variations in the natural environment, mechanical changes in a weapon system due to wear and tear, evasive and other self-preservative actions of the target, disruption of the natural environment by combat operations (smoke, dust, etc.), failure of portions of a weapon system, and personnel errors.

OPERATIONAL HIT PROBABILITIES. Those hit probabilities to be expected when a weapon system is manned by troops who are subject to the physiological stresses of combat.

OPERATIONAL KILL/HIT PROBABILITY. The probability of a kill in a tactical environment, an approximation of which may be derived by combining operational hit probability data with technical lethality data.

OPERATIONAL STATEMENT. A statement which can be verified or refuted by experimentation. Essential Elements of Analysis (EEA) and experimentation objectives should always be stated as operational statements.

OPERATIONAL TEST I (OT I). (As defined in the FYTP.) This test provides early information as to system operational suitability, and a comparison to existing systems, in order to assist in determining whether the system should enter Full-Scale Development. OT I may help identify or refine critical issues to be examined in subsequent operational testing. Also see FORCE DEVELOPMENT TESTING AND EXPERIMENTATION and USER TEST.

OPERATIONAL TEST II (OT II). (As defined in the FYTP.) This test is accomplished prior to the low rate initial production decision (ASARC IIa/DSARC IIa for major systems) and provides an assessment of system operational suitability and effectiveness. It also provides information needed to refine or validate organizational and employment concepts and determine training and logistic requirements. Complete interchange of information and data obtained during DT II and OT II is mandatory. During OT II the system is subjected to a realistic operational environment, using small troop units typical of those that ultimately will be equipped with the system. OT II will produce sufficient and timely results to allow for an independent evaluation to be available to assist in making a Low Rate Initial Production decision at ASARC IIa/DSARC IIa for major systems. The DA letter authorizing development of nonmajor systems will specify the command to conduct OT II. Also see FORCE DEVELOPMENT TESTING AND EXPERIMENTATION and USER TEST.

OPERATIONAL TEST III (OT III). (As defined in the FYTP.) This test is accomplished using low rate initial production models and provides information to refine or validate earlier estimates of operational effectiveness, to determine the operational suitability of the production model, to determine the adequacy of organization and doctrine, to validate training and logistic requirements, and to identify additional actions that should be taken before the full production decision is made. Also see FORCE DEVELOPMENT TESTING AND EXPERIMENTATION and USER TEST.

OPERATIONAL TESTING AND EVALUATION (OTE). User Test and Evaluation conducted in support of specific Materiel System Acquisition Programs to assess a prospective system's military utility, operational effectiveness, and operational suitability (including compatibility, interoperability, reliability, maintainability, and logistic and training requirements), and the need for any modifications. In addition OTE provides information for organization, personnel requirements, doctrine, and tactics. It may provide data to support or verify material for operating instructions, publications, and handbooks.

OPERATIONS ANALYSIS.

1. A scientific discipline that uses analytical techniques for the examination of operational systems in order to identify critical components and performances. This information may be used for the improvement of the system by change in emphasis on certain elements or procedures, or by the introduction of new operational methods.

2. The selection and synthesis of components for the development of an operational system, and the examination of its total performance by analytical methods.

3. The development of operational, logical or mathematical models for use in the development or simulation of systems. The procedures and tools used by an operations analyst to quantify the relationships among system components are referred to as operations research techniques.

PARAMETER.

1. An arbitrary constant characterizing some particular aspect of a system (as of expressions, curves, surfaces, functions) by each of its possible values. A specific value is fixed by the stated case or discussion.

2. A quantity that describes a statistical population. A clear distinction should always be drawn between parameters and estimates; i.e., between quantities that characterize the universe, and estimates of these quantities calculated from observations.

PHYSIOLOGICAL STRESS. Emergency bodily reactions to adapt to stressful situations, which if maintained over an extended period of time, are self-defeating and may result in exhaustion and physical deterioration. See STRESS.

PRECISION.

1. Degree of refinement with which an operation is performed or a measurment stated. A measure of dispersion is also a measure of precision.

2. (Statistics.) Amount of freedom from variability attributable to experimental or sampling error.

PROBABILITY.

1. Mathematical probability is a theoretical (pertaining to a hypothetical or ideal population) relative frequency of occurrence of events based entirely or defined properties of the objects and events considered. If an event can happen in a certain number of distinguishable ways and some of the ways are regarded as favorable, then the ratio of the number of favorable ways to the total number of ways is called the mathematical probability of the event occuring favorable, provided that the total number of ways of occurrence are independent and equally likely. Consider a box containing 8 white balls, 24 black balls, and 48 red balls — 80 balls in all. If we draw one ball, the probability of drawing a black ball is 24/80 or .30 and of drawing a red ball is 48/80 or .60.

2. Empirical probability is an observed relative frequency of occurrence of events based upon sampling results. If an event can happen in a certain number of distinguishable ways, and some of the ways are regarded as favorable, then the ratio of the number of favorable occurrences to the total number of occurrences represents the empirical probability of the event occurring favorably, provided that each occurrence is independent. If, for instance, at CDEC we wished to determine the probability of the occurrence of events, such as obtaining a hit, a near miss, or a miss in rifle firing, we might fire a rifle 100 times and find the number of occurrences of hits, near misses, and misses were 62, 28, and 10, respectively. The ratios obtained (62/100, 28/100, and 10/100) empirical probabilities which approach the mathematical (true) probabilities as the number of trials (firings) becomes very large.

3. A probability estimate is a prediction of the relative frequency with which a specified event may be expected to occur.

PROBABILITY DISTRIBUTION. A probability distribution function measures the probability that a numerical characteristic (measured quantity) will be less than or equal to some real number. Generally it is expressable as a sum or as an integral. Also see DISTRIBUTION and FREQUENCY DISTRIBUTION.

PROBABILITY OF DETECTION. The probability of discovering the presence or existence of an actual target.

PROBABLE ERROR.

1. A probable error in range is a measure of the dispersion of the fire of a weapon, measured parallel to the line-of-fire. It is defined as that distance from the center of fire (both over and short) which includes 50 percent of all rounds fired.

2. A probable error in deflection is a measure of the horizontal dispersion of the fire, measured along a perpendicular to the line-of-fire. It is defined as that distance from the center of fire (both right and left) which includes 50 percent of all rounds fired.

3. A probable error in height or burst is a measure of the vertical dispersion of the air bursts delivered by a weapon. It is defined as that distance from the center of burst (both above and below) which includes 50 percent of all bursts.

4. In theory, half of all independently aimed projectiles will deviate less than one probable error in range. A similar statement may be made concerning deflection and height of burst. When deviations are considered in two dimensions, one-fourth of all projectiles will deviate less than one probable error in both dimensions simultaneously. Similarly, one-eighth of all projectiles will deviate less than one probable error in three dimensions simultaneously.

5. Also see CIRCULAR ERROR PROBABLE, DELIVERY ERROR, DEVIATION, HORIZONTAL ERROR, and DISPERSION ERROR.

PROGRAM EVALUATION AND REVIEW TECHNIQUE (PERT). A management planning method for defining and integrating events to insure completion of program objectives on schedule. The primary instrument employed by PERT is a PERT network, a flow chart consisting of all the activities required to meet program objectives, showing their planned sequence of accomplishment, interdependencies, and interrelationships. Such charts may depict both time and cost factors.

PROJECT TEAM (CDEC). A military task group headed by a Project Team Chief usually formed on a task force basis to perform experimentation missions assigned by DCS, Experimentation. The team is augmented as necessary with military and civilian personnel and is supported by civilian scientific and editorial personnel.

PSYCHOLOGICAL STRESS. Heightened behavioral reactions to adapt to stressful situations, which is maintained over an extended period of time, are self defeating and may lead to degradation in mental functioning and an increase in inappropriate behaviors.

QUASI-COMBAT. "...conditions, which duplicate, to a good approximation, important aspects of situations under extended combat." (Frankford Arsenal Report 1380-A.) The term quasi-combat data is commonly used to include any data that is not derived from

combat operations but that supposedly represent the results to be expected in combat under specified conditions.

RANDOM ERROR. (Statistics.) Chance variation. That part of the variability of a set of observations or scores that can be attributed to chance or the operation of random factors. As a result of random error, the observed value will depart from the mean value as much or as often in one direction as in the other, so that the algebraic average of random errors for a large number of cases approaches zero. See DISPERSION.

RANGE.

1. The limits of a set of values; a sequence, series, or scale between values; the difference between the greatest and least values of the variable of a frequency distribution.

2. The set of values a function may take on.

3. The class of admissible values of a variable.

RANK ORDER.

1. An arrangement of greatest to least or vice versa; arrangement of a series in such a way that each successive member represents a value larger (or smaller) than the preceding. It is not necessary that the amount of difference between successive members be measured, nor that successive differences are even approximately equal.

2. A normalized rank order results from statistical procedures that assign numerical values to the items, and provide the interval values between items.

RELIABILITY.

1. (Statistics.) The property of a series of observations, of a measuring instrument, or of an entire measuring process, that makes it possible to obtain similar results

upon repetition; the degree to which similar results may be predicted; the degree to which measurement is free from random influence. Reliability is a measure of freedom from variability in the results obtained but not necessarily from persistent errors (biases). It may also be expressed as the "internal consistency" of a measuring device composed of multiple items.

2. (AR 310-25.) The probability of a device performing its mission adequately for the period intended under the operating conditions expected to be encountered.

REPLICATION. Repetition of trials in an experiment in which each trial (or replica) maintains the same experimental conditions to provide an estimate of experimental error and to increase the precision with which the mean effects of the individual variables are measured.

RESERVE EXPERIMENT. An experiment which has no stipulated time of execution, time for completion of the report, and for which no funds have been specifically programmed. Normally these experiments are preplanned, low resource, short duration activities using organic CDEC elements. A reserve experiment is fielded as directed by the Commander, CDEC to fill voids or delays in the experimentation program.

RESULTS. Data obtained from experimentation or from model(s).

RISK LEVEL. See LEVEL OF SIGNIFICANCE.

SAMPLE.

1. A part of a statistical population whose properties are studied to gain information about the whole; specifically, a set of observations which are gathered in the course of an experiment (which may include one or more samples). The sample of observations is usually assumed to be representative of a much larger number of possible observations or measurements that might be made under the same experimental conditions.

2. Sometimes used to refer collectively to the participants (subjects) in an experiment.

SENSITIVITY ANALYSIS. Used in cases where parameters are not accurately known, it is a procedure for solving an equation or operating a model (usually once with high and again with low assumed values for the parameters) in order to determine the extent to which the solution is sensitive to variations in the parameters.

SINGLE SHOT KILL PROBABILITY (AR 310-25). The probability that a single projectile fired at a target will destroy or effectively disable that target.

SIMULATION.

1. An imitation of a dynamic device, system or situation which generates results similar to actual phenomena themselves. Examples of simulation models include a scale model physical structure such as the Link Trainer, an analog model such as the Moniac (the hydraulic model of the British economy), and a symbolic simulation using numerical equations such as a Monte Carlo model of an airplane flight.

2. A type of model employing stochastic inputs or processes which normally uses the Monte Carlo method of solution.

STANDARD DEVIATION. (Statistics.) A measure of the dispersion or variability of a distribution; an indication of the extent to which a number of indivdual values taken as a group differ from the mean of the values. The more the values differ from each other and the mean, the greater will be the standard deviation. It is also called the root mean deviation.

STOCHASTIC. Stochastic processes or models are those which contain random variables. Synonym for random.

STRESS. (Biological.) Stress is an idea or concept that is formulated to bridge the gap between events in the environment and the actions of an individual when it appears that

the former is placing a load or demand on the individual and the individual's reaction is an accentuation of, or beyond the realm of, normal functioning. Thus, stress can be described in environmental terms—such as time stress—or in reference to the individual. Individual reactions to stress are categorized as physiological and psychological, though there is no clear distinction between the two categories. See PSYCHOLOGICAL STRESS.

SUBJECTIVE DATA. See DATA, SUBJECTIVE.

SURVIVABILITY. The capability of a military system to resist damage from enemy action, equipment failure, human error, or natural phenomena which would result in the loss of the system's capability to perform the missions for which it was designed.

SURVIVAL PROBABILITY. Probability that a weapon or system will continue to function satisfactorily under a given set of operational conditions.

SYSTEM.

1. (AR 310-25.) An integrated relationship of components aligned to establish proper functional continuity towards the successful performance of a defined task(s).

2. An operational system consists of equipment and skills, together with any related facilities, services, information, and techniques, that form a complex or unit capable of performing specific operational tasks in support of an identifiable objective.

3. See WEAPON SYSTEM.

SYSTEM ERRORS. The bias and dispersion of fire about the mean center of fire delivered by a weapon system. They are attributable to both inherent errors and to operational errors. They may be expressed as probable errors, circular errors probable, or standard deviations.

SYSTEMATIC ERROR.

1. (AR 310-25.) Repeated error due to faulty adjustment of an instrument or to a defect in it. Systematic errors are those that remain the same while accidental errors due to mechanical or other variations, change from one time to the next. Also called instrumental error.

2. See BIAS.

TACTICAL EFFECTIVENESS. The success of a weapon or system in fulfilling its intended purpose in an operational environment. Usually, the effectiveness of a weapon or system may be measured in more than one way.

TARGET.

1. Area Target - A target consisting of an area rather than a point.

2. Hard Target - An armored vehicle or fortified position.

3. Point Target - A target that requires the accurate placement of fire.

4. Soft Target - Any target other than those defined as "hard targets."

TECHNICAL PERFORMANCE DATA. Data that portray the characteristics and capabilities of weapons and ammunition in terms of interior, exterior and thermal ballistics, to include kill probabilities under specified conditions. These data are collected from firings conducted for research and development evaluations pertaining to factors such as range, muzzle velocity, and penetration effects.

TECHNIQUE.

1. A body of technical methods, such as statistical techniques, used in scientific research for analysis and presentation of results of experimentation.

2. Also see AR 310-25.

TRADOC GUIDANCE MEMORANDA (TGMs). Documents published by Headquarters, TRADOC, grouping actions together into logical functional programs, assigning proponency for the program to a particular functional center, identifying resources to be applied, and establishing critical milestones.

TRIAL. A single, continuous performance of an experimental event or series of experimental events for the purpose of measuring dependent variables.

USER TEST. (As defined in the AR 71-3.) A generic term that encompasses Operational Testing and Evaluation (OTE), which is part of the materiel acquisition process (AR 70-10), and Force Development Testing and Experimentation (FDTE), which relates to the doctrinal, organizational and requirement aspects of the force development process. See OPERATIONAL TEST I, II, III and FORCE DEVELOPMENT TESTING AND EXPERIMENTATION.

VALIDITY.

1. A property of the whole measuring process, but especially of the method or instrument employed, that insures that the obtained scores correctly measure the variable they are supposed to measure. The estimate of the degree to which an instrument measures what it is supposed to measure is the validity coefficient. Most often this is the coefficient of correlation between a set of scores and an independently obtained set of scores (sometimes called the criterion scores) which are believed to represent the variable to be measure. For example, a field test for predicting the combat effectiveness of a weapon system is valid to the extent that the results obtained correlate with results obtained in actual combat.

2. See AR 310-25.

VALUE. (Mathematical.) The magnitude of something, or the number that represents the magnitude.

VARIABILITY.

1. The deviations of scores in a set from each other or from some standard, the fact that the scores or measure or values differ, or the degree to which they differ. The range, variance, average deviation, and standard deviation are common measures of variability.

2. See AR 310-25.

VARIABLE. A factor in an experiment which changes during the course of the experiment. At CDEC, variables are classified as: independent, dependent, and extraneous.

1. An independent variable is one that is intentionally and specifically changed, or allowed to change, by the experimenter in order to observe the effects of such changes on the dependent variables.

2. A dependent variable is one that is observed by the experimenter in order to determine the changes which it undergoes as a direct result of changes in the independent variable(s).

3. An extraneous variable is one that is not selected by the experimenter for treatment as an independent variable, but is nevertheless expected to cause changes in the dependent variable(s). To the extent necessary and practical, the experimenter compensates for the effects of the extraneous variable(s) by techniques of experiment design.

VARIANCE. A measure of dispersion, equal to the square of the standard deviation for a given set of data.

VARIATE. See VARIABLE.

VULNERABILITY PROBABILITY. Probability of being disabled or destroyed during performance of a specified activity under a given set of operational conditions.

WEAPON SYSTEM (AR 310-25). A weapon and those components required for its operation. (The term is not precise unless specific parameters are established.) See SYSTEM.

APPENDIX G

REGULATIONS PERTAINING TO CDEC EXPERIMENTATION

AR 710-2, Jan 81, w/C6. Materiel Management for Using Units, Support Units, and Installation.

This regulation establishes procedures for the accountability of government property. Experimentation planners must include time and personnel for the establishment and maintenance of property accountability.

AR 735-11, Jan 79. Accounting for Lost, Damaged, and Destroyed Property.

This regulation established procedures for the accounting of lost, damaged, or destroyed government property.

CDEC Command Policy 735-11, Nov 80. Procedures for Processing Government Property Lost or Damaged Reports (GPLD) or Reports of Survey.

This policy delineates responsibilities and outlines procedures for the processing of GPLD's and Reports of Survey within CDEC. Experimentation planners should be aware of the provisions of this policy.

AR 700-112, Feb 75. Relocatable Buildings.

This regulation establishes procedures for the procurement, temporary load, utilization, and disposition of relocatable buildings that qualify under the interim facility requirement. This regulation is the regulation which governs most of our trailer leases.

CDEC Reg 700-1, Dec 80, w/C1. Ammunition.

This regulation establishes procedures and responsibilities for the forcasting, requisition, transportation, issue, and turn-in of ammunition within CDEC. Primary interest to the experiment planner is the forcasting of experimentation ammunition.

CDEC Reg 700-3, Apr 77. Experimentation Support (under revision).

This regulation establishes the policies and procedures for providing non-instrumentation related logistical support for CDEC experiments. Of primary interest to the

planner is the type of information required to identify equipment and the responsibilities of CDEC organizations.

CDEC Command Policy 71-2. Responsibilities for External Personnel and Logistical Experimentation Requirements.

This policy delineates the responsibilities of CDEC elements for actions pertaining to external personnel and logistical experimentation requirements.

National Environmental Policy Act (NEPA). Federal Register 5578-560007, Nov 78.

DOD Directive 60501. Environmental Effects of DOD Actions in the United States.

AR 200-1, Jan 78. Environmental Protection and Enhancement.

TRADOC Suppl to AR 200-1, Feb 79. Environmental Quality, Environmental Protection and Enhancement.

CDEC Reg 200-1, Mar 80. Environmental Quality, Environmental Protection.

National Environmental Policy Act (NEPA) requires that any decision maker analyzing the feasibility of a project or operation take into consideration the negative and positive impacts of the proposed action on the human environment. Analysis and documentation is required before a decision is made. Negative impacts are not prohibited, but they must be identified, documented, and, where practicable, mitigated. The above listed polices, directives, and regulations are for the implementation of NEPA by CDEC.

CDEC Reg 420-2. Fire Prevention and Protection.

To establish responsibilities and prescribe procedures within this command for fire prevention, protection, and control at Fort Ord and Fort Hunter Liggett.

CDEC Reg 58-1, Dec 80. Administrative Motor Vehicle Management.

This regulation describes the procedures for requesting vehicles on a daily basis and special vehicle requirements such as road clearances, HET requests and overnight

dispatches. The test planners should familiarize themselves with this regulation in order to properly request and coordinate transportation requests for experiments.

CDEC Reg 105-1. Communications and Electronics.

This regulation describes the telephone control procedures in effect for CDEC, and for telephone calls in CONUS and overseas. Test planners must be familiar with this regulation in order to comply with established telephone procedures, and to control expenditures.

CDEC User Driver Policy, Apr 80.

This policy provides CDEC user drivers with guidance on obtaining a driver license, and the maintenance and control requirements regulating use of government vehicles. Experiment personnel are required to have all drivers licensed in order to perform their field transportation requirements.

AR 725-50, Aug 80, w/C8. Requisitioning, Receipt, and Issue Systems.

This regulation prescribes procedures to requisitioners and suppliers for all military services.

AR 750-1, Apr 78, w/C1. Army Materiel Maintenance Concept and Policies, CDEC Reg 750-1.

This regulation sets forth concepts, objectives, principles, and policies for responsibilities of maintenance of army materiel.

TM 38-750, May 78, w/C3. The Army Maintenance Management System (TAMMS).

This manual describes procedures for the control, operation, and maintenance of all army materiel.

FM 29-1, Aug 75. Organizational Maintenance Operations.

This manual describes SOP's for the organizational motor pool and organizational maintenance.

NOTE: The regulations listed in this appendix are in addition to those already referenced elsewhere in this manual.

APPENDIX H

ABBREVIATIONS

ACN	- Action Control Number
ACSI	- Assistant Chief of Staff, Intelligence
AD	- Accession Document
AMSAA	- Army Materiel Systems Analysis Agency
ASARC	- Army Systems Acquisition Review Council
ASP	- Army Strategic Plan
BASE	- Basic Army Strategic Estimate
BOI	- Basis of Issue
CAA	- Concepts Analysis Agency
CAC	- Combined Arms Center
CACDA	- Combined Arms Combat Developments Activity
CATRADA	- Combined Arms Training and Doctrine Activity
CDEC	- Combat Developments Experimentation Command
CDOG	- Combat Development Objectives Guide
CG	- Commanding General
COA	- Comptroller of the Army
COEA	- Cost and Operational Effectiveness Analysis
CTA	- Common Tables of Allowance
CTEA	- Cost and Training Effectiveness Analysis
CTP	- Coordinated Test Plan
DA	- Department of the Army
DARCOM	- Army Material Development and Readiness Command
DCO	- Deputy Commanding Officer
DCS	- Deputy Chief of Staff
DCSEX	- Deputy Chief of Staff, Experimentation
DCSLOG	- Deputy Chief of Staff, Logistics
DCSOPS	- Deputy Chief of Staff, Operations and Plans
DCSPER	- Deputy Chief of Staff, Personnel

DCSPLANS	- Deputy Chief of Staff, Plans
DCSRM	- Deputy Chief of Staff, Resources Management
DCSTE	- Deputy Chief of Staff for Test and Evaluation
DEVA	- Development Acceptance
DHSS	- Data Handling Subsystem
DSARC	- Defense System Acquisition Review Council
DT	- Development Test
DTIC	- Defense Technical Information Center
DTP	- Detailed Test Plan
ECC	- Experimentation Control Center
ECO	- Experimentation Control Officer
EDP	- Electronic Data Processing
EEA	- Essential Elements of Analysis
ESC	- Experimentation Support Command
ETG	- Experimentation Task Group
FDTE	- Force Development Testing and Evaluation
FHL	- Fort Hunter Liggett
FOE	- Follow on Evaluation
FORSCOM	- US Army Forces Command
FYTP	- Five-Year Test Program
IAW	- In Accordance With
IC	- Instrumentation Command (Provisional)
ICC	- Information Control Center
IEP	- Independent Evaluation Plan
IER	- Independent Evaluation Report
IPR	- In Process Review
JTD	- Joint Test Directorate
JTF	- Joint Test Force
MCS	- Multiple Computer System
MOPIC	- Motion Picture Production
MOS	- Military Occupational Specialty
MOE	- Measure of Effectiveness
O&F	- Organization and Functions

OSD	- Office of Secretary of Defense
OT	- Operational Test
OTEA	- Operational Test and Evaluation Agency
OTP	- Outline Test Plan
OTRS	- Operational Test Readiness Statement
P&A	- Personnel and Administration
Pam	- Pamphlet
PAMRD	- Personnel and Materiel Requirements Document
PCP	- Program Change Proposal
PERT	- Program Evaluation and Review Technique
PIP	- Product Improvement Proposals
PL	- Position Location
PO	- Project Officer
P&R	- Policy and Review
RAM	- Reliability, Availability, and Maintainability
RCTA	- Real Time Casualty Assessment
RDTE	- Research, Development, Test and Evaluation
Reg	- Regulation
RMS	- Range Measuring System
ROC	- Required Operational Capability
RS	- Resume Sheet
SA	- Scientific Advisor
SIGSEC/OPSEC	- Signal Security/Operations Security
SOP	- Standing Operating Procedures
SSL	- Scientific Support Laboratory
TCATA	- TRADOC Combined Arms Test Activity
TDA	- Tables of Distribution and Allowance
TDP	- Test Design Plan
T&E	- Test and Evaluation
TEA	- Training Effectiveness Analysis
TGM	- TRADOC Guidance Memorandum
TR	- Test Report
TRADOC	- Training and Doctrine Command

TSARC	**- Test Schedule and Review Committee**
TSP	**- Test Support Package**
USACDEC	**- US Army Combat Developments Experimentation Command**
USALOGC	**- US Army Logistics Center**
USAMSAA	**- US Army Materiel Systems Analysis Agency**
USATRADOC	**- US Army Training and Doctrine Command**
VRS	**- Voice Recording System**
VTR	**- Video Tape Recorder**